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"Scire est nescire, nisi id me Scire alius sciret."

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THE TWENTY-SEVENTH LONG FOX MEMORIAL LECTURE:

DELIVERED IN THE UNIVERSITY OF BRISTOL ON TUESDAY, 15th NOVEMBER, 1938.

BY

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ON

AIR AS A CONDUCTOR OF ELECTRICITY.

SINCE an electrified body normally retains its charge when surrounded by air, the air in its ordinary state must be an exceedingly good insulator. But it may be made conducting in a variety of ways. Thus it may easily be demonstrated* that the leaves of an electroscope gradually fall when a lighted match is held near to it or when the radiations from radium

* The use of the word "demonstration" in this account covers some of the experiments shewn in the lecture.

or an X-ray tube pass through the air surrounding it. The penetrating power of X-rays can be shown in this way across a large lecture theatre.

The conducting properties of the air may be explained in the following way: On modern views an atom consists of a central positively charged nucleus where its mass is concentrated, surrounded by a number of negative electrons. The two charges are equal, so that the atom, treated as a whole, is electrically neutral. The charge on the nucleus determines the element. Thus hydrogen has 1 positive charge, helium 2, lithium 3, and uranium, the heaviest element, 92. When a train of short electromagnetic waves such as X-rays or the gamma rays from radium is absorbed by an atom, the result is that one of its electrons is shot out at high speed. We thus produce in the gas two carriers of electricity, one a negative ion (electron), and the other the original atom bereft of one negative charge and therefore a positive ion. The high speed electron, however, can also produce a similar though less violent disturbance in atoms near which, or even through which, it passes. It may travel in this way a considerable distance before it comes to rest and will leave in its path a number of pairs of ions which define its trail. By making use of the property of ions that they can act as nuclei for the condensation of mist, these particles can be loaded up to a visible size. All that is necessary to see these tracks is to carry out the experiment in moist gas and then suddenly cool it by a rapid expansion.

Other ionizing projectiles may be used, such as hydrogen nuclei (protons), which are hydrogen atoms from which the electron has been removed. Alpha particles, which were first discovered by their emission from radium in its natural disintegration, show very

pronounced tracks because of their greater mass and ionizing power; they are helium nuclei.

The production in this manner of a number of ions in air is all that is necessary to give it conducting properties, because they carry charges and can thus give rise to an electric current between two electrodes to which a voltage is applied. The movement of these ions can be copied as a demonstration on a magnified scale by using coloured powders of electrified red lead and yellow sulphur and also by electrified soap bubbles.

When the voltage is greatly raised, then any ions which may be present acquire a high speed and act themselves as ionizing projectiles. The new ions so produced repeat the process and in this way it rapidly works up to explosive violence giving rise to a spark. The voltage necessary to give rise to a spark is reduced if a number of ions are supplied to the spark gap from another source to start off the process. This effect may easily be demonstrated and is the basis of the action of the "clucker" installed at the Bristol General Hospital as a detector of radium. In this instrument an electrical circuit is arranged so that a succession of flashes of glow occur in a neon lamp, each giving a "cluck" in a loud speaker. If the voltage is reduced so that these flashes just fail to pass, and if radium is then brought near to the lamp, the gamma rays from the radium produce ions in the neon gas in the lamp, so that the applied voltage is now sufficient for the succession of discharges to take place. The clucker may thus be used rapidly to test dressings, or refuse from an incinerator, for radium suspected to be missing.

These processes of ionizing a gas do not in general result in the "splitting of an atom." To alter an atom fundamentally one must alter its central nucleus,

and to do this one must make a direct hit. This is now being done using intense beams of high speed protons and also neutrons, a valuable new particle, which has a nucleus of the same mass as hydrogen, but no electric charge.

In many cases it is found that a projectile making a direct hit may enter the nucleus of the atom that it strikes, thus adding to its mass and its charge. The result is expressed in a new type of chemical equation in which we have to equate the masses as well as the charges of the colliding nuclei on the two sides of the equation. The resultant nucleus is sometimes so unstable that it immediately disintegrates, giving out a high speed particle which may be recognized by the length and density of its ionization track. An example of this, historically the first, was obtained by bombarding nitrogen with alpha particles—

$$^{14}_{7}\mathrm{N} + {}^{4}_{2}\mathrm{He} \longrightarrow {}^{17}_{8}\mathrm{O} + {}^{1}_{1}\mathrm{H}$$

The figures on the top left represent the masses of the atoms. When the alpha particle enters the nucleus of nitrogen an atom of mass 18 would be produced. But this is completely unstable and ejects a proton of mass unity leaving one of the isotopes of oxygen of mass 17. The bottom left hand figures give the charges involved and it will be seen that these also balance.

In some cases the resultant new atom does not immediately break up, but behaves like radium in that it may break up at any moment. Thus, if large numbers are produced, some will be breaking up all the time over an extended period, the rate of breaking up falling off as the number of *unbroken* atoms decreases. This is the phenomenon of artificial radioactivity, examples of which are now very numerous.

A typical example is obtained by firing neutrons at a sodium salt; this gives rise to a new variety of sodium possessing the same chemical properties as ordinary sodium but having atoms of mass 24 instead of 23. The equation is as follows:—

$$^{23}_{11}\mathrm{Na} + {}^{1}_{0}\mathrm{neutron} \longrightarrow {}^{24}_{11}\mathrm{Na}$$

Sodium 24 is not permanently stable and sooner or later changes into non-radioactive magnesium with the emission of a high speed electron or beta ray.

$$^{24}_{11}\mathrm{Na} \longrightarrow {}^{24}_{12}\mathrm{Mg} + {}^{0}_{-1}\mathrm{electron}$$

The rate of decay of radio-active sodium is such that half of it disappears in 14½ hours, three-quarters of it in 29 hours, and seven-eighths of it in 58 hours. Since the "half-life" for radium is 1,700 years, it is possible to make a quantity of sodium which is enormously more powerful than the same mass of radium, but only, of course, for a limited period. In this way samples of radio-active common salt have been artificially made in one experiment equal in power to nearly half a gram of radium. It is possible not only to demonstrate the emission of the high-speed particles during the disintegration, but also actually to count the number emitted in a given time.

Another element likely to be of great biological use is radio-active phosphorus, which has a "half-life" of 14½ days. It is therefore not so powerful as sodium, but its longer life increases its applicability.

These new radio-active elements are now being applied to biological problems, because they produce a method of tracing biological processes by atoms which are labelled by their radio-active properties. Indeed, they show promise of throwing much light on many

outstanding problems in metabolism. Thus, if some radio-active phosphate is added to a phosphate meal given to an animal, the time that elapses before the phosphorus atoms enter the bones, the teeth, or other organism, can be determined. For instance, it has already been shown that fully synthesized radio-active lecithin is found in the brain tissue of a fully-grown rat only one hour after a sodium phosphate injection has been administered. Information of this type cannot be acquired by any other known method. Similarly the percentage of atoms eaten which subsequently enter any given structure may be estimated. Experiments also on the effect on these quantities of diet or disease are brought within the range of attack.

The possibility of the use of radio-active elements as substitutes for radium in radium therapy must be regarded at present as an open question. But some radio-active elements emit intense gamma rays. If such an element could be produced *in situ* in any affected part of the body by injecting the appropriate parent element and then bombarding it with neutrons, it might be a most effective agent.

It is clear that we are witnessing the birth of an entirely new development of profound significance. It may well prove to be one of the most important contributions ever made by physics to medical research.

SYPHILIS IN THE TROPICS.*

BY

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IN the middle of the fifteenth century, when syphilis first appeared in Europe, it was known as the *great pox*, because its cutaneous manifestations so far exceeded in their severity those caused by smallpox. Since that time the disease in Europeans has gradually suffered a change in that the cutaneous lesions have become progressively less striking while the visceral damage has become more serious. To-day one seldom sees a profuse secondary syphilide in Europe, whilst subcutaneous gummata, necrosis of the bones of the skull and similar gross lesions of the tertiary stage are great rarities: but aortitis and general paresis remain to remind us of the seriousness of the disease.

It happens that in different parts of the world to-day, in different races of mankind, syphilis manifests itself in a guise reminiscent of that which it adopted in the fifteenth century in Europe. If we travel from Central Africa down the White Nile to Egypt, and then make a detour through Northern Africa as far as Morocco, returning to Palestine, Syria, and Turkey,

* A Paper read to the Society on Wednesday, 9th November, 1938.

and, finally, pass up the Dalmatian coast on our way home to Western Europe, we shall see all sorts of gradations between the syphilis of the middle ages and the disease as we know it in England to-day.

YAWS.

Before we embark upon this journey it is necessary to decide whether we shall include in our study the tropical disease which goes by the name of *yaws*. There has long been a controversy on this subject, some maintaining that yaws is a separate entity while others consider it merely syphilis in a different soil. It may repay us to consider how the distinction between the two conditions came to be made and upon what criteria that distinction is now maintained. In the early days of the exploration of Central Africa medical observers were impressed by the prevalence of a disease which they, from their experience in Europe, recognized as syphilis; they noticed that it produced very gross cutaneous lesions of a granulomatous nature which, to their epicurean eyes, resembled raspberries: for this reason the French named it *frambœsia*. In 1902 Jonathan Hutchinson published a monograph on yaws and in this he expressed the opinion that it was syphilis modified by race and climate. Then in 1905 Schaudinn and Hoffmann described the spirochæte of syphilis, *Treponema pallidum*, which they observed in chancres and inguinal glands of syphilitic patients. Later in the same year Castellani applied Schaudinn's method to two cases of yaws in Ceylon and discovered a treponema which he considered different morphologically from that of syphilis: this was named *Treponema pertenue*. It is now known that the two organisms are indistinguishable, but this is, of course, no proof of their actual

identity. Unfortunately, the mistaken belief that the treponema of yaws was proven to be a distinct organism from that of syphilis led to an almost universal acceptance of the view that the two diseases were distinct.

Certain criteria have been enunciated whereby a differential diagnosis may be made on clinical grounds. They are well summarized in the following table taken from Manson-Bahr's[1] text-book of tropical diseases :—

YAWS.	SYPHILIS.
Not congenital.	Congenital.
Primary sore—extragenital.	Primary sore—usually genital.
Secondary Stage.	*Secondary Stage.*
(*a*) Typical yaw pathognomonic : furfuraceous desquamation and plantar lesions characteristic.	(*a*) Seldom imitates frambœsia.
(*b*) Mucous membranes not affected.	(*b*) Mucous membranes affected.
(*c*) Itching common.	(*c*) Itching rare.
(*d*) Alopecia unknown.	(*d*) Alopecia may occur.
(*e*) Eyes unaffected.	(*e*) Iritis common ; choroiditis and retinitis rare.
Tertiary Stage.	*Tertiary Stage.*
(*a*) Visceral lesions absent.	(*a*) Visceral lesions occur, *i.e.* peri-cellular cirrhosis, gumma of liver, kidney, etc.
(*b*) Nervous system never seriously affected.	(*b*) Nervous system prone to infection : Tabes, G. P. I.
(*c*) Blood-vessels : no endothelial proliferation as in syphilis.	(*c*) Endarteritis obliterans—cerebral thrombosis.
Yaws better resisted. Constitutional disturbances slight : great exuberance of eruption and cheloid scarring.	Syphilis attacks constitution, affecting the vital structures.
Does not respond to mercury.	Responds well to mercury.

This table has provoked a great deal of criticism, notably that of Blacklock[2] (1932), whose analysis of the question was a great consolation to me at a time when I was beginning to despair of finding a case of true yaws.

Bearing in mind the distinctions tabulated above we will now survey briefly the manifestations of

treponematosis—if one may use that term to cover yaws and syphilis—in different parts of the world.

SOUTHERN SUDAN.

The southern boundary of the Bahr-el-Ghazal province of the Anglo-Egyptian Sudan is adjacent to the Belgian and French Congos. Part of the country is mountainous with many streams, but the greater portion consists of low-lying land which is under water for many months of the year. The climate is hot and humid. The various indigenous tribes wear no clothing and live in primitive huts where close bodily contact is inevitable; they have no notion of methods of isolation of the sick, although they are usually aware that they contract diseases from their neighbours. Should one of them develop *treponematosis* and become covered with a secondary rash his relatives will still sleep and feed with him, using the same food vessels and sleeping in the same bed: it is little wonder that the disease is contracted non-venereally with extra-genital primary inoculation.

In the Bahr-el-Ghazal the disease is called yaws. Here it most nearly satisfies the criteria given above. Children are more frequently affected than adults. The primary lesion, if it can be distinguished, is usually extra-genital, and the secondary stage is characterized by a profuse cutaneous eruption of crusted papules which contain spirochætes demonstrable by dark-ground examination. Figure 1 is a photograph of the shoulder of a small boy whose cutaneous eruption had been present for two or three months. There are many large, flat, granulomatous papules, teeming with spirochætes, which in places show healing at the centre with epithelialization: such central healing gives rise eventually to annular lesions similar to that

in Figure 2. It is a notable feature of these skin lesions of the secondary stage that, while the majority heal spontaneously in a few months, a few are apt to persist for a long while. It is not uncommon to see condylomata in the axillæ and perineum a year or more after all other lesions have resolved. Periostitis is a frequent occurrence in the secondary stage and is one of the most distressing features of the disease: in the absence of treatment it is apt to persist for years. For these reasons it is often impossible to decide whether the patient is in the secondary or in the tertiary stage: the latent period seen so constantly in Europe is absent.

In the absence of any facilities for autopsies one cannot give an accurate account of the visceral lesions. If aneurysms occur they are very rare. I have seen one case of aortic regurgitation in a man with a positive Kahn reaction who gave a history of having the disease several years previously; he also had leukoplakia of the tongue and some small papillomata on the scrotum. His four children, one born before he was infected, also had cutaneous lesions and were said to have caught it from the same source as their father; one of them is illustrated in Figure 2.

Not infrequently in the late stages granulomata appear beneath the skin of the sole of the foot. On account of the tension of the dense subcutaneous tissue and the thick skin in this situation these granulomata are very painful and make walking difficult. The name *crab yaws* is applied to this condition because the patient walks awkwardly, like a crab. It is indisputable that one does not see this manifestation of *treponematosis* in the northern Sudan, or in any other parts of the world where the disease is called syphilis. To my mind this phenomenon may be

explained on environmental grounds: it occurs in districts where the natives walk bare-foot and where the country is swampy or actually under water for a great deal of the year. We have seen that cutaneous lesions of the secondary stage persist in moist regions of the body, and it is likely that a combination of trauma and moisture applied to the soles of the feet may explain the development of the lesions of crab yaws.

The condition known as *gangosa* (Figure 3) is a destruction of the palate and nasal bones which may occur a year or more after the onset of yaws; it is really an exaggeration of the palatal perforation seen in tertiary syphilis.

Meningo-vascular disease, tabes and general paresis are unknown: but routine examination of the cerebro-spinal fluid gives evidence of meningeal irritation—a significant increase of cells or protein—in some cases. In my series the changes were slight and far less frequent than those encountered in the northern Sudan.

Congenital transmission is rare. I saw one case of a new-born infant covered with a profuse cutaneous eruption: its mother was in the florid secondary stage. No instance of late congenital disease has ever been noted.

In summary we may say that in the southern Sudan *treponematosis* is largely a childhood disease caught by contact. The cutaneous lesions are profuse and persistent and, with the exception of periostitis, visceral lesions are rare.

NORTHERN SUDAN.

As we travel north down the Nile the country, climate and people change. At Malakal, in the Upper

PLATE XVIII

FIG. 1.
The secondary lesion of yaws.

FIG. 2.
A secondary yaws lesion which has healed centrally and become annular.

FIG. 3.
Gangosa.

FIG. 4.
Acquired syphilis in an infant. Note lesions on the mother's breast due to inoculation from the suckling infant.

PLATE XIX

FIG. 5.
Axillary chancre and fine papular syphilide.

FIG. 6.
Profuse crusted secondary syphilide in a desert Ar

FIG. 7.
Perineal condylomata of the late secondary stage.

FIG. 8.
Secondary annular syphilide on neck of
Khartoum prostitute.

Nile province, the tribes are different and a larger proportion of the people wear clothing. Here the disease is rather more frequently acquired in adult life, although not necessarily venereally: extra-genital primary lesions are often seen. Figure 4, taken at Malakal, illustrates a condition seen throughout the Sudan; the child was born healthy and caught the disease from a playmate; the mother had some lesions on her breast, acquired from the child, but she had not developed any generalized lesions. It seems likely that this partial immunity of the mother may be due to previous infection in her own childhood.

In the desert of the north-west Sudan, in Kordofan and Darfur provinces, the population consists of a mixture of tribes, many of whom are nomad Arabs. The climate is hot and dry. The natives wear clothing to protect them from the sun. In this part of the country *treponematosis* is more akin to syphilis as we know it in Europe. There is a fairly high incidence of venereal infection, with typical Hunterian chancres, in adults, but extra-genital and childhood infection is still very common. Figure 5 shows a chancre in the axilla of a man who has a fine generalized papular syphilide. The cutaneous eruptions are as a rule very florid (Figure 6) and tend to persist in moist areas as condylomata (Figure 7); such condylomata are indistinguishable from those seen in the Bahr-el-Ghazal province in cases of *yaws*, and equally from those of undoubted syphilitics in Khartoum. Periostitis is the most painful feature and is apt to be present for years, giving rise eventually to marked bony deformities. Aneurysms are occasionally seen, but cardio-vascular lesions are far less common than the prevalence of the disease would lead one to expect. Routine examination of the cerebrospinal fluid shows

a higher incidence of pathological changes than was found in the south, but considerably less than in Khartoum. Meningo-vascular syphilis is not uncommon, but tabes and general paresis are unknown.

In a country where normal births are not registered it is obviously impossible to form an estimate of the frequency of still-births. Occasionally one sees newborn infants covered with a profuse cutaneous syphilide, but these seldom survive. It would almost seem as though the parents fail to transmit the disease unless they themselves are suffering from a recent infection: in this case the fœtal infection is so heavy that it is lethal. I have heard of only one case of late congenital syphilis in the whole Sudan; this was seen by one of my medical colleagues in Darfur: the patient was a man with a sunken nasal bridge and Hutchinson's teeth. Frequently natives say that their tertiary lesions are inherited, but that is only in regions where civilization has made them conscious that some moral stigma attaches to the admission of venereal infection.

KHARTOUM AND OMDURMAN.

In Khartoum and Omdurman, the largest towns in the Sudan, the population is very mixed. There are Arabs and various Nilotic tribes. The conditions of life are very different from those of the regions we have so far considered. People live in houses and wear complete clothing. The climate is hot but not very humid, and, except during the brief rainy season, the ground is parched by the sun. Syphilis is very prevalent: thirty per cent. of the 400 prisoners in the Central Prison in Khartoum, whose blood I examined, had positive Kahn reactions. It is almost entirely venereally acquired and typical chancres on the genitals are the rule. Occasional chancres on the lip and

tongue are not really exceptions to the venereal rule. The secondary stage is characterized by various types of cutaneous syphilide, most of which are much more florid than anything seen in England to-day. Figure 8 shows the neck of a Khartoum prostitute in the secondary stage; the papules are healing in the centre and thus becoming annular. They are precisely similar to those seen in the same stage of *yaws* in the southern Sudan. Crusted *frambœsial* lesions are also seen, but not so commonly as in the south. The secondary skin lesions clear up spontaneously, more rapidly than they do in the south, and there is, therefore, more distinction between the secondary and tertiary stages. Lesions on the mucous membrane of the mouth are more commonly seen. Periostitis is still responsible for most of the patients' discomfort.

In the tertiary stage aortitis is common. I was able to collect a good series of specimens of aneurysm of the aorta for the pathology museum of the Kitchener School of Medicine. Gummata are of fairly frequent occurrence. I made a neurological study of over four hundred cases of syphilis in the district of Khartoum and also examined every lunatic who was held in custody. My results showed that there is a heavy invasion of the meninges, as judged by gross changes in the cerebrospinal fluid, in the secondary stage. Sometimes this is sufficient to give symptoms of meningitis with ocular disturbances. Such cases of clinical meningitis occur especially as neuro-recurrences some six months after the cessation of insufficient arsenical treatment. In the first six months forty per cent. of cases had pathological cerebrospinal fluids; this figure then fell until the fifth year, when it again rose, reaching about thirty-five per cent. in fifteen years.

These figures do not mean that thirty-five per cent. of tertiary syphilitics have neuro-syphilis, but that spirochætes have reached the meningo-vascular supporting structures of the central nervous system. Thirteen per cent. of 229 tertiary syphilitics admitted to hospital were actually being treated for meningo-vascular syphilitic symptoms, and yet there has never been a single case of tabes or general paresis in any native of the Sudan! I examined every lunatic who was in custody, and there was never a case of general paresis. On the other hand both tabes and general paresis occur in Greeks, Egyptians and other nationalities living, and presumably infected, in the country.

There is clear evidence in Khartoum that congenital transmission does occur, and it is probably true to say that a large number of still-births are due to that cause; and yet even here one does not see the classical stigmata of congenital syphilis.

MOROCCO, ALGIERS AND EGYPT.

In Northern Africa, Morocco and Algiers, syphilis manifests itself in the same way as it does in the desert regions of the north-west Sudan. Lacapère has described the profuse crusted cutaneous eruptions of the secondary stage, the paucity of tertiary visceral lesions and the absence of tabes and general paresis. Here again childhood infection is common.

In Egypt syphilis is much more as we know it in England: it is almost entirely venereally acquired; the secondary syphilides are less florid than they are in the Sudan, but still occur more constantly than they do in this country. Visceral tertiary manifestations are frequent and tabes and general paresis are found: the last less commonly than in England.

SYRIA.

In Syria great differences have been noted by Hudson[3] between the manifestations of syphilis as it occurs in town-dwellers and in the nomads of the surrounding desert. So great is the difference that the Arabs consider the desert form to be a distinct disease and give it a separate name *bejel*. For details of this condition reference must be made to Hudson's description, and it suffices to say that in the towns the disease is venereal syphilis, while in the desert it is a childhood disease. Nomad Arabs frequently come into Omdurman, in the Sudan, and bring their whole families to hospital for anti-syphilitic treatment: the children, of all ages, have as a rule profuse crusted sores; it is one of the exanthemata of childhood and yet it is surely syphilis.

Macqueen[4] has described an identical state of affairs in Palestine, and recently von Düring[5] has published his observations on endemic syphilis in Constantinople and the north-western provinces of Asia Minor between the years 1890 and 1902: here again it was a childhood disease with few visceral lesions in the tertiary stage but many disfiguring involvements of the palate and nasal bones, akin to gangosa.

In the hinterland of Dalmatia, Bosnia and Herzegovina the same type of childhood infection has been reported, and it is interesting to note that up to a hundred or so years ago there was an endemic disease in the north of Scotland called *sibbens* which seems to have been non-venereal syphilis. Ehlers says that the same thing was true of Denmark, and that in Sweden one hundred years ago ninety per cent. of cases of syphilis were acquired non-venereally.

In many other tropical countries, such as Jamaica and the Philippines, yaws occurs. There has recently

been a Royal Commission on Yaws in Jamaica and in their report Turner[6] and his associates state their belief that yaws and syphilis are distinguishable: but they do so on the basis of the same criteria that appear in Manson-Bahr's table, and this to my mind invalidates their conclusion.

It might be thought that one should be able to make a distinction between yaws and syphilis by histological examination of biopsy specimens of the skin lesions. I have excised many lesions of all types from different parts of the Sudan and am quite unable to detect any differences between comparable lesions of yaws and syphilis. The much-quoted *endarteritis* is by no means a salient feature of the secondary skin lesions in syphilis, and there is certainly no justification for making that one of the criteria for differential diagnosis.

DISCUSSION.

We have now made our brief survey of *treponematosis* in many parts of the world. It remains to attempt an explanation of the differences we have observed.

It is surely clear that people who wear no clothing and have no knowledge of personal hygiene have ample opportunities for acquiring syphilis without sexual intercourse: it follows that the site of the primary lesion and the manner in which it is acquired are of no significance. But, nevertheless, there is one important aspect of this question: venereal disease is acquired by adults. When an infection is transmitted by ordinary contact children are at risk. I am sure that this is the explanation of the frequency of yaws in childhood; and, since the disease is very prevalent in the districts where it occurs, a high proportion of

the population is infected in childhood and thus become immune to subsequent adult exposure. Blacklock[2] has stressed the importance of distinguishing between syphilis acquired in childhood and that acquired in adult life. Many diseases are different under these two conditions. Some of the results of childhood infection with syphilis can be predicted, and the chief of these is the bearing that it will have upon the frequency of congenital transmission subsequently. It is known that the risk of an untreated syphilitic woman transmitting the disease to her children diminishes very considerably with the passage of time. It is probably safe to say that this risk is slight at the end of ten years: if that be conceded we have an explanation of the rarity of congenital *yaws*, for by the time affected children reach child-bearing age they are no longer infective. Unfortunately, this is not the whole story, for we have seen that adults as well as children do acquire the disease and they should be capable of transmitting it to their children. We have noted that it is not only in yaws districts that congenital disease is rare: precisely the same condition obtains in syphilis in the northern Sudan and in *bejel* in Syria. I should like to suggest, tentatively, that when syphilis is transmitted through the placenta in these people it produces so great a reaction that the fœtus is killed. We have seen that the disease is characterized by very profuse cutaneous lesions in children and in adults: it is perhaps reasonable to suppose that the fœtus shares this capacity for responding violently to the infection; it is certain that the cases of congenital disease that I have seen have been covered with moist syphilides. It seems to be a case of "all or none."

It would be very useful if we could explain why the

cutaneous reaction is so severe in natives of the tropics. A partial explanation, at any rate, is provided by a consideration of the factor of exposure. The most exuberant lesions occur among naked people living in a hot, humid atmosphere. The desert Arabs are exposed to the sun and their scanty clothing is indescribably dirty: they never wash; their cutaneous lesions are second only in severity to those of the last group. And it is interesting to note that when an Arab takes up residence in a town, wears clothes, and learns to wash, his secondary syphilide is much less florid. This, essentially, is the difference, to my mind, between the cutaneous lesions of Hudson's cases of *bejel* and those of his town-dwellers. But here again, that is not the whole story. Europeans living in the tropics show the usual European manifestations when they contract syphilis: there is a racial factor in addition to the environmental one.

We noted at the beginning of this paper that syphilis has suffered a change in Europe since it was first introduced in the fifteenth century. Tropical syphilis to-day has much in common with the great pox. It is tempting to suggest that syphilis was not introduced to the tropical countries where yaws now abounds until a comparatively recent date, but here we are on very unsure ground. Although it is fairly generally accepted that syphilis was brought from America by Columbus the evidence is not by any means complete; proof of pre-Columbian syphilis is not easy to adduce on either side of the Atlantic. The origin of yaws is still more obscure: it was present in Central Africa when the first European explorers arrived there, but that is little more than a hundred years ago, and of its previous history we know nothing.

The suggestion has been made that the absence of

tabes and general paresis, and also the character of the cutaneous reactions, may be due to the fact that malaria is endemic. The view that malarial attacks in the early stages of syphilis may have a prophylactic action against the development of general paresis does not seem to be warranted by the evidence. Many cases have been recorded where Europeans living in the tropics have been exposed to almost constant malarial infection before, during, and after their infection with syphilis, and yet in due course they have become paretic. It seems that malaria serves only as a therapeutic measure. It might be argued that the natives do not leave the malarial country in which they live and so are getting the benefit of constant malarial treatment. There is one great objection to this suggestion: adults in highly malarial districts have a considerable immunity to malaria and it is almost only the children who suffer; adults may be infected when they are bitten by mosquitoes, but the plasmodium does not proliferate sufficiently to cause a febrile reaction. One might expect to get valuable information on this point from statistics of syphilis in the American negro, but they are difficult to interpret. There are conflicting reports in the literature with regard to the relative incidence of general paresis in whites and blacks admitted to asylums in the United States. The possibilities of error are self-evident. The proportion of whites to blacks in the contributory population and the relative incidence of syphilis and of other types of mental disease must be taken into account. There are several marked differences between syphilis in the American negro and that in whites, but these negroes cannot be compared with their African cousins because their environment is so different.

The possibility that there are several different strains of *treponema* responsible for the varying grades of syphilis must be considered. Cultural methods are not available and one has to rely upon the results of animal inoculation. Pearce and Brown[7], and Chesney[5] have reported certain differences between the testicular lesions produced in rabbits with *yaws* and syphilis strains, but it is not certain that these are constant. In a small series that I inoculated I could see no difference. Schöbl[9] has described some most striking lesions in Philippine monkeys inoculated with *yaws*: they resembled human *yaws* most surprisingly, but he did not use sufficient controls with other strains of treponema from cases of syphilis. It is sometimes said that there are *neurotropic* strains of the treponema of syphilis which are responsible for general paresis and tabes, but the evidence for this is most unsatisfactory. The original *neurotropic* strain was isolated by Nichols[10] from the cerebrospinal fluid of a case of meningo-vascular syphilis, not from a paretic, so that it has no claim to be considered neurotropic at all. There is no denying that different strains of *Treponema pallidum* do exist: they have quite different effects on experimental animals; but there is very little evidence that they are responsible for the variety of the manifestations in man.

The part played by treatment is a difficult one to assess, and it cannot be discussed here. I believe that treatment in the early stages robs the patient, as it does experimental animals, of a certain amount of immunity, but since that immunity is very slight it is a good bargain to exchange it for thorough treatment. Unfortunately, natives in the tropics seldom get thorough treatment and there is reason to fear that

they may be harmed by it. With reference to the statement that yaws differs from syphilis in not responding to mercurial treatment, it is amusing to note that one of Castellani's two cases, from whom he obtained his *Treponema pertenue*, was undergoing mercurial treatment with improvement.

SUMMARY.

In conclusion, I believe that the chief differences between the reaction of the native of the tropics to the treponema and that of the white man depend upon the fact that the former gets a violent cutaneous reaction in the secondary stage and so acquires a greater immunity. The law of inverse proportions enunciated by Brown and Pearce holds for man as well as for animals, in that the visceral lesions of the tertiary stage are inversely proportional to the severity of the original cutaneous reaction. There is room for further experimental work in animals to determine just how much difference there may be between the various strains of treponema. Most of the work in the past has been done with rabbits. It would be most interesting if someone were to repeat Schöbl's[9] experiments on the Philippine monkey, using strains of treponema from various parts of the world. In the present state of our knowledge it appears that the varying responses to infection that we have just surveyed can best be explained on the basis of racial and environmental factors, and of these the racial is by far the greater.

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UNIV. OF MICH.

A GUIDE DOG FOR THE BLIND.

BY

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IT is thought that readers might be interested in this short account of the first guide dog for the blind in the City and County of Bristol or in Gloucestershire.

In 1936, "R.H.," a man of 42, married, with a family, was taken ill with symptoms of raised intracranial pressure. He was a draughtsman at Filton Aeroplane Works, in a good position.

Investigations at the Royal Infirmary (Dr. Richard Clarke, Professor Rendle Short and the writer) all pointed to the presence of a "space-occupying lesion." Ventriculography revealed severe internal hydrocephalus. His vision was nil in the right eye, and the field was markedly restricted in the left eye.

On 6th November, 1936, exploratory craniotomy was performed and finally a right-sided sub-temporal decompression. The headache was at once relieved, the vomiting gradually disappeared, but vision rapidly failed, the patient being left with bilateral secondary optic atrophy. For the past two years he has remained "cured but blind" in the lay sense of the term even if one has to be more guarded in its scientific application. It is not necessary to enlarge on the horrors of his position, suddenly deprived of work, amusement, income, with a family to educate. The

"horror of darkness" which every blinded man undergoes was particularly troublesome here in that neither he nor his wife believed he had more than a few months to live.

With the passage of time and its healing influence, "R.H." began to believe that he was indeed "cured," and then the writer decided to get a guide dog for him, believing that a doctor should treat the environment when he cannot treat the patient directly.

There is in this country a charity termed "The Guide Dogs for the Blind Association," with its training centre at Wallasey, Cheshire. The writer applied for a dog for his patient, and (thanks to help from many friends) the man was accepted and finally sent for. At Wallasey bitches (mainly Alsatians) are trained for approximately three months. The bitch must be absolutely trustworthy as well as intelligent, as the blind man places absolute reliance on the dog's guidance and will unhesitatingly follow the dog's lead. The patient had to spend a period at Wallasey, where he was taught the system, trained with his dog and finally passed his tests and was sent home to begin his adventures. The dog wears a semi-rigid harness with a handle which the patient can comfortably grasp (see photograph). The dog also wears a chain or lead. When the dog is on the lead she knows she is "off duty"—the stand-easy position. When the harness is held the dog is "on duty," ready to guide and care for her master. The dog understands the commands "Left," "Right," and "Forward," but with this significant addition—she will not obey such commands until it is safe to do so. The writer was greatly impressed to see "R.H." with "Nigger" at the curb of a fairly busy road—six times he commanded "Forward, Nigger!" and five times

the dog did not move, because of cars or cycles. On the sixth occasion she moved off in good order, not checking until she reached the opposite curb, which the patient then felt for with his foot. Clearly, intelligent obedience rather than simple obedience is required. "R.H." told the writer that it might be five minutes before the cautious dog would take him across a very busy road like the Gloucester Road. Obviously, a blind man cannot dash across in and out of vehicles.

"R.H." has had his dog some two and a half months and is only just at the beginning of his capabilities, but already he has the following achievements:

(1) He goes out twice a day, wet or fine, a distance of about two miles. This is in his regulations, as these big dogs love exercise.

(2) He crosses the Gloucester Road by himself and has no anxiety in such a hazardous procedure. As mentioned above, he may first have to pause for a long time.

(3) He has been to the Royal Infirmary and back from Filton alone with his dog.

(4) He daily does the shopping with his dog in a district with which he is, of course, familiar.

It is proper, at this stage, to add some of the things the animal will *not* do. Thus, "R.H." does not whisper "Fishmonger" in the animal's ear, whereupon the sagacious hound leads his master faithfully to the nearest fish-and-chip shop! In fact, he does not even say "Home, Nigger!" when he turns back on one of his strolls. It is for "R.H." to take the dog, not the dog take him. The dog's duty is solely to safeguard the owner. Of course, dogs soon get used to habit, and if, for example, "R.H." every Sunday afternoon went to hear the open-air speakers on

Durdham Down, it is quite probable that if he said, after some weeks, "Downs, Nigger!" then the intelligent animal would set off for the meetings! This is not unreasonable, as every dog-owner knows how a dog appreciates habit and routine. Again, the dog does not know the way, and the patient has at times to ask where he is, and when told knows then what directions to give to his dog. The writer has been asked why bitches are selected. It is because they are more docile and affectionate than dogs and, also, excepting when on "heat," they do not show an interest in other dogs. As a bitch only "comes on heat" twice in the year for three weeks at a stretch, this is not a serious drawback, though at these times they are difficult. Ordinarily, the bitch ignores the advances of dogs.

In conclusion, it may be said that the improvement the Guide dog has brought to "R.H.," both psychologically and in general health, is difficult to describe in a short space in a public journal. Surely, such work is a part of the healing art?

The writer will be pleased to give any further information he can to interested readers. By the editor's courtesy, he is allowed to say that he will gladly forward to the Guide Dogs for the Blind Association, any donations that charitable readers may feel disposed to give to such a laudable work. The training of a dog and man works out at about £60.

DRINKER'S "IRON LUNG" AND OTHER ARTIFICIAL RESPIRATORS.

BY

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Emeritus Professor of Medicine in the University of Bristol.

LORD NUFFIELD'S splendid offer to supply the hospitals of the kingdom with artificial respirators or "iron-lungs" has aroused much interest and inquiry into the apparatus used for carrying out artificial respiration by mechanical methods.

One of the earliest types of artificial respirator was the "Pulmotor," which consisted of a face-piece such as is used for nitrous oxide anæsthesia, a long flexible rubber tube connecting the face-piece with a cylinder of compressed oxygen. Between the connecting or delivery tube and the cylinder of oxygen was a pair of small "concertina-type" bellows which were set in motion by releasing the oxygen from the cylinder. There was also a bag (as in Haldane's oxygen apparatus) which served to keep the oxygen pressure from rising too high in the delivery tube. Thus the oxygen on its way to the face kept the pump working, and this produced alternately a negative and positive pressure in the delivery tube provided the face-piece was closely applied to the face. This apparatus has been successfully used in mine-rescue work. When Rawlinson's army made its famous advance in front of Amiens on 8th August, 1918, a surprisingly large

number of these, or some similar artificial respirators, were found in the captured German trenches. They had been kept there for the resuscitation of men overcome by carbon monoxide in mining operations or in dug-outs. One pulmotor was presented to the Bristol Royal Infirmary soon after the War. It cannot now be found! The suction effect on which this apparatus depends has been condemned as dangerous and ineffective by several authorities.

In the late nineteen twenties the high incidence of respiratory paralysis in an epidemic or series of epidemics of anterior poliomyetitis in the U.S.A. led Professor Drinker of Harvard University, after much experimental work, to design a chamber large enough to accommodate a grown male in which by variation of the surrounding air-pressure in the chamber artificial respiration could be maintained indefinitely by mechanical means. Professor Drinker's first models were made of wood, but he found steel to be more serviceable. The steel model was quickly named the "Iron Lung," and it was this model which Professor Drinker brought to England in 1930 and demonstrated to the profession. By the courtesy of Siebe, Gorman & Co. Ltd., the manufacturers of the apparatus, and Sir Robert Davis (managing director of the Company), we are enabled to give the following description and illustrations of Professor Drinker's apparatus as manufactured in this country by Siebe, Gorman & Co.

THE DRINKER RESPIRATOR.

The Drinker respirator is a device for the prolonged administration of artificial respiration, and was designed by Dr. Phillip Drinker, of Harvard University. The Manual methods are not well adapted by prolonged use, and it is almost impossible by their means to produce and maintain adequate oxygen interchange in cases requiring long-time

PLATE XXI

THE DRINKER RESPIRATOR.

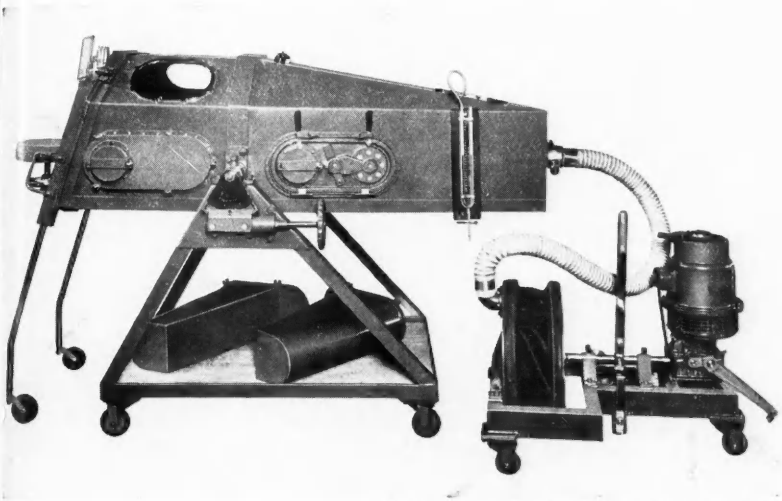


Photo. by courtesy of Messrs. Siebe, Gorman & Co. Ltd.

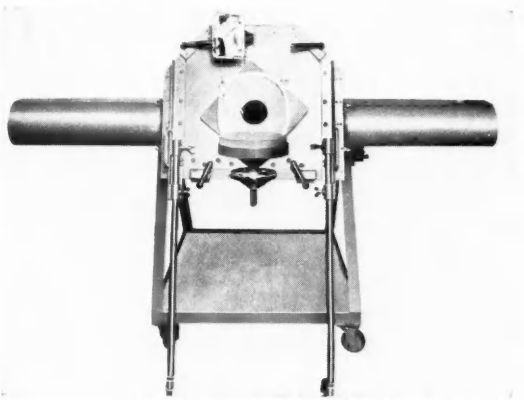
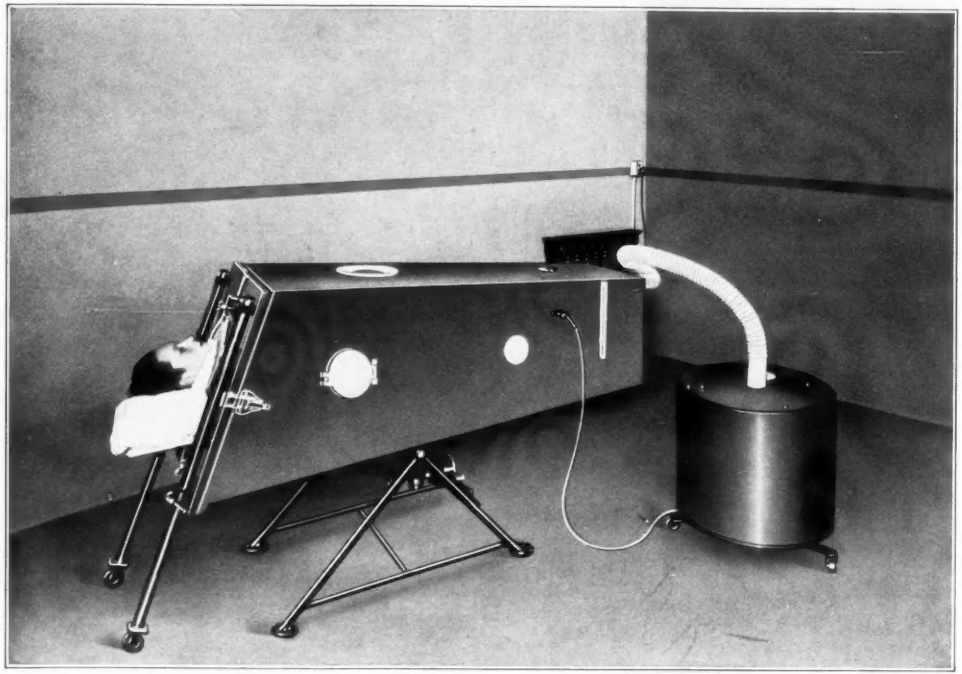


Photo. by courtesy of Messrs. Siebe, Gorman & Co. Ltd.

Arm extensions for cases which require splinting.

THE BOTH CABINET RESPIRATOR.



Photo, by courtesy of D. & J. Fowler Ltd.

The Respirator in use.

PLATE XXII

administration. What is needed is a mechanical device which will be capable of working steadily over a long period of time, will permit control of the rate and depth of respiration, and will be capable of producing adequate artificial respiration without discomfort or harm to the patient. These requirements are satisfied by the Drinker respirator, an apparatus consisting of an enamelled steel chamber, which is large enough to accommodate a man 6 ft. 4 in. in height, and can also be used for a small child.

The patient lies on a sectional sponge-rubber mattress placed on a truck, which is attached to the lid of the chamber. The head and neck of the patient extend beyond the lid through a rubber collar, the head resting on a pad attached to the lid. The lid and truck of the chamber can be pulled in and out with ease to permit occasional examination of the patient, and these motions can be accomplished very rapidly. By means of an electrically-driven bellows the pressure inside the chamber is alternately reduced and restored to normal. Both speed and depth of respiration can be varied. In the event of failure of the electricity supply, means are provided for operating the machine by hand. Conscious patients can eat, drink and sleep in the respirator without stopping the mechanism. The head-rest and the upper part of the bed are adjustable for height. Tubular extensions can be provided, if required, to accommodate cases in which splinting of the arms is necessary. The apparatus can also be made to tilt in either direction.

In emergencies, and without pulling out the bed, enemas and rectal drips can be administered through the hand-holes provided in the side of the machine, and a rectal tube can be inserted by a person reaching in through one of the portholes.

The apparatus has been used successfully in cases of respiratory failure resulting from poliomyelitis, severe carbon monoxide poisoning, morphine and other drug poisons, alcoholic coma, hiccoughs, drowning, and, in the small size specially made for babies, numerous cases of asphyxia in the new-born.

The model which Lord Nuffield has selected is a modification of the "Drinker" iron lung designed by Mr. Both, and was manufactured by D. & J. Fowler Ltd. It is constructed in wood, and is known as the "Both Cabinet Respirator." Messrs. D. & J. Fowler have courteously supplied the

Photo, by courtesy of D. & J. Fowler Ltd.

The Respirator in use.

following description of the apparatus and lent the block for its illustration:

BOTH CABINET RESPIRATOR.

The function of this machine is to operate the patient's lungs when for any reason, *e.g.* infantile paralysis, he has lost the power of operating them himself.

The machine consists of two parts, an air-tight cabinet in which the patient lies, and a mechanically operated bellows which reduces and increases the pressure in the cabinet. The two are connected by a flexible rubber tube.

The cabinet unit consists of a box made of laminated board which stands on a tripod to which is attached a tilting device enabling the cabinet to be tilted to any desired angle. Inside the box is a bed which can be easily slid in and out and the end of which forms one end of the box. The patient is placed on the bed with his head protruding through a hole in the end, the bed is then slid into the box which is made air-tight by the end being clamped on to the box by four quick-acting clamps. The joint is insulated with rubber mouldings, and a rubber band goes round the patient's neck so that the whole of his body is in an air-tight chamber while his head protuudes at one end.

The bellows unit consists of a $\frac{1}{3}$-h.p. electric motor which, through a set of reducing gears, drives a pair of bellows. These bellows draw the air out of the cabinet, thus allowing the patient's lungs to expand. The bellows then restore the pressure in the cabinet and empty the patient's lungs. The motor drives the gear-box by means of a rubber belt, and three different sized driving-wheels are fitted so that three different rates of pulsation can be obtained, 18, 24 and 32 per minute. Should the motor fail the drive to the bellows can be immediately disconnected and the bellows can be worked manually by a handle which projects through the top of the bellows unit, and is a permanent fixture.

The ventilation of the cabinet and the degree of pressure can be regulated by means of two valves, one placed on the cabinet, and the other on the top of the bellows unit, and a certain amount of attention can be given to the patient without opening the cabinet through two armholes which are fitted one on either side near the level of the patient's shoulders.

There is yet another mechanical respirator constructed on a different principle in which no box or cabinet is used, namely:

THE BRAGG-PAUL PULSATOR.

PLATE XXIII

THE BRAGG-PAUL PULSATOR.

Photo. by courtesy of Mr. R. W. Paul.

Applicable to adults, adolescents and children without restriction of posture.

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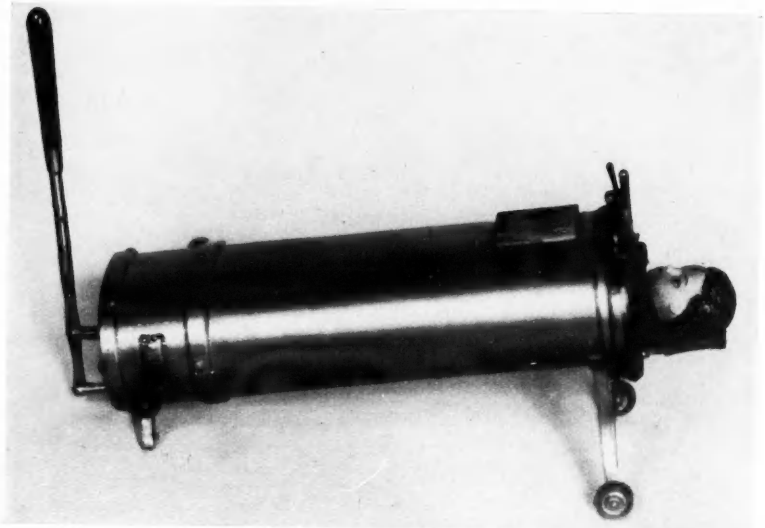
PLATE XXIV

THE SPIROPHORE.



By courtesy of "Bulletin de L'Académie de Médecine" and of Dr. Woillez.

Invented by Dr. Woillez (of Arras) in 1876.

THE BRAGG-PAUL PULSATOR.

It was originally devised by Sir William Bragg for the use of a friend suffering from progressive muscular atrophy as described in the *Lancet* by Dr. Phyllis M. T. Kerridge.[1]

Artificial respiration is maintained by the rhythmical application of pressure to the exterior of the chest around which a hollow rubber belt is fastened. Air at a definite pressure is forced into this belt by electrically driven bellows regulated to the appropriate respiration-rate. This pulsator is readily transportable, works quietly, and may be placed at any distance up to 8 feet from the patient, being connected to the air bag by a flexible hose-pipe. The pulsator is normally driven by electricity, it can also be worked in emergency by a hand-lever. About 50 Pulsators are already installed in hospitals in the United Kingdom. The apparatus is simply a mechanical air-belt substituted for the hands as employed in Schäfer's method of artificial respiration.

The method is one of applying positive pressure to the chest in contrast with the cabinet or box methods which depend upon negative pressure. Dr. Kerridge pointed out that positive pressure can be applied continuously for several years without ill effects. Further information can be had from Mr. R. W. Paul of 69 Addison Road, London, W. 14.

THE SPIROPHORE.

The principle of the iron lung was first introduced in 1876 when Dr. Woillez, of Arras, a member of the French *L'Académie de Médecine*,[2] designed a mechanical respirator for the treatment of asphyxia under the name of the "Spirophore."

The apparatus consisted of a flattened metal cylinder large enough to admit the body of an adult. One end was capable of being hermetically closed by a lid, in the middle of which was an opening large enough to allow the patient's head to pass through, and furnished with a rubber sheet fixed at one part of

its circumference to the opening, and by another part capable of being fixed on the patient. At the opposite end of the cylinder a piston was fitted to move up and down in the cylinder by means of an outside handle. On the upper surface of the apparatus was a large window through which the interior could be seen. It was supported on small wheels and furnished with large handles so that it would be easily moved. The cylinder contained a sort of moveable stretcher which could be pulled in and out so as to place the patient in the most suitable position.

The method of use was to introduce the whole of the patient except the head and neck. The air-tight lid was closed and the rubber sheet was made to adhere carefully to the margin of the lower jaw and the back of the patient's neck. With the handle of the lever the piston was moved up and down, creating a alternate compression and exhaustion of the air in the interior of the cylinder. Through the window the movements of the thorax and abdomen were watched producing alternate dilation and contraction in a thoroughly physiological manner. Thus artificial respiration was completely and quietly maintained. The amount of air which could be inhaled into the lung by means of this apparatus was more than one litre. In the first model the piston worked in a small independent cylinder joined by large tubes to the main cylinder. In a special model made for new-born infants, a concertina bellows was adapted directly to the upper surface of the apparatus and was worked by hand.

The apparatus obtained a silver medal at an exhibition of life-saving apparatus held at Le Havre, soon after it had been exhibited at the Academy of Medicine in June, 1876. In spite of the advice of the manufacturer, Dr. Woillez always declined to patent the idea, being of the opinion that no obstacles should be placed in the way of the use of any apparatus designed for the saving of life.

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Reviews of Books

A Cerebral Atlas. By R. J. A. Berry, M.D., F.R.S.E., F.R.C.S. Pp. xxvi., 425. Illustrated. London: Oxford University Press (Humphrey Milford). 1938. Price £5 5s. 0d.—Haeckel's dictum "that every psychic action requires the complete and normal condition of the correlative brain structures for its full and normal exercise" contains a basic truth which sometimes is overlooked in the study of mental deficiency. Professor Berry, the Director of Medical Services at Stoke Park Colony, is one of the pioneer workers who has based his researches on this sure foundation. One of his earliest papers, published in 1913, in the *Proceedings of the Royal Society of Victoria*, dealt with the cubic capacity of the brain in 355 criminals. This investigation was undertaken to discover whether there exists a physiological correlation between the size of the head and intelligence. During the quarter-century that has elapsed, Professor Berry has had unusual opportunities, first in Australia and then in England, for a continuous study of mental deficiency. His conclusion is unshaken that what is termed "mind" is a function of the "brain," and that the development of a normal human intellect demands the development of a normal human brain. The *Cerebral Atlas*, now under review, consists primarily of a photographic comparison of the brains of 120 mental defectives with the brains of 77 reputedly normal individuals. The mental defectives' brains were unselected, and represent 120 consecutive necropsies. They are, in this *Atlas*, compared age for age with the normal brains. Not only, however, are the naked-eye features of the brains compared, but as the mental and other reactions of the defective individuals were known and observed during life, it has been possible to give an account of the physical, neurological, and mental phenomena and to correlate these findings with the brain after death. The photographs which are included in the *Atlas* demonstrate most convincingly the differences in size between normal and defective brains. Briefly expressed, the defective brain is seen to differ from the normal in being lighter, smaller, and having a smaller cortical area, whilst in many instances the

defective retains in its adult condition features of the embryonic or fœtal brain. Professor Berry brings this last point into prominence by giving on page xxi a table comparing the retention of embryonic or fœtal features in defective and normal brains. Thus he emphasizes the importance of studying mental deficiency from the embryological standpoint. The more deeply mental deficiency is studied the clearer it becomes that mental defect is closely allied to cerebral defect, and that cerebral defect is much more frequently of pre-natal than post-natal origin. In his discussion of the numerous developmental errors found in this series of brains, Professor Berry gives a clear and succinct calendar of the intra-uterine development of the fœtal brain. He is able, moreover, to demonstrate the date during the intra-uterine life at which embryological development was arrested or grossly interfered with in many of the brains illustrated. Apart from gross arrest or interference, some consideration is given to cortical histogenesis, and to the histopathology of the defective brain. Eighty per cent. of defective brains show such obvious evidence of aberrant cellular development in the cortex as to be incompatible with normal mental functions : in the remaining 20 per cent. the gross errors of development or pathological departure from the normal are sufficient to explain the intellectual defects. With each set of brain photographs a full description is given of the individual, namely :—

County or Origin. Sex. Age.
Legal classification under the Mental Deficiency Acts.
Mental state during life in one or more different ways.
(*a*) Developmental grade.
(*b*) Merrill-Palmer mental age.
(*c*) Binet I.Q.
(*d*) Porteus I.Q.
Length, breadth and height of head and brain.
Size of brain.
The brain product (as ascertained by multiplying together length, breadth, and height, and taking the three first figures as an index.)
Proportion of brain product to head product.
Weight of right cerebral hemisphere.
Amount in square centimetres of brain areas.
Proportion of pre-central area to total area.
Height and weight of defectives.
Family and social histories of the defectives (when ascertained).
The mental and neurological reactions of the defectives.
Causes of death.

At the end of the volume are a number of extra excellent photomicrographs of brain sections prepared by Dr. R. M. Norman. These examples tend to show that the cellular construction of the cerebral cortex in mental deficiency is as fundamentally erratic as is the naked-eye anatomy

of the brain. This *Cerebral Atlas* is one of the most important contributions to the study of mental deficiency that has ever been published. Yet it is not in itself anything more than an invitation to study. Although a great deal of information may be derived from its pages, in the introduction it is stated that the collection of brains at Stoke Park Colony is available to students or investigators, who may, on application, obtain access to all the original specimens. One hemisphere of each brain is mounted as a permanent museum specimen, the other is preserved for present or future examination. Although it is probable that the conclusions which Professor Berry draws from his own study of the specimens are incontestable, every opportunity is offered to other workers to study the specimens anew and draw further and possibly different conclusions. For the most part Professor Berry has been content to record facts with the impartiality of a trained observer. He scarcely permits himself to draw conclusions from his observations, but one conclusion is irresistible, and he commits himself to it. In the series of brains studied in this *Atlas* it is almost impossible to explain their many embryonic and fœtal features by any other cause than a pre-natal one. In this series the possibility of the cerebral defects being due to birth injuries can be ruled out in almost every case. Defects in cerebral development, rather than brain injuries or brain disease, are the usual cause of mental deficiency. In the letterpress of the *Atlas* no attempt is made to discuss the causes which bring about such arrests or errors of development. The author mentions as possible causes differences in the genes, faulty embedding of the fertilized ovum in the uterine mucosa, impoverished states of the maternal blood from a variety of causes—all operative in the earliest stages of the embryo—and not excluding other known or possibly pathological processes acting at a later stage on the fœtus. Taken all in all, Professor Berry has made an outstanding study of the morbid anatomy of mental deficiencies, perhaps the most notable study made hitherto. His work has been made possible by the generosity of the Incorporation of National Institutions for Persons requiring Care and Control, and of the present Warden and co-founder, Mrs. R. G. Burden, who in 1933 established the Burden Mental Research Trust. It is under the auspices of this Trust and largely at its expense that this magnificent *Atlas* has been published. As a splendid example of typography it would be hard to over-praise the volume. The Oxford University Press may well be proud of such a production. The brain photographs are artistically

reproduced, and the letterpress is printed in beautiful type on art paper with generous margins. In spite of its size this vast folio volume is attractively readable. Printed in gold on the binding is a figure of the brain drawn by Sir Christopher Wren to illustrate Willis's book in 1664: an unforgettable collaboration of two Oxford professors. This *Cerebral Atlas* is a book which no neurologist, psychologist or psychiatrist can ignore: it offers an explanation of Feuchtersleben's inconvenient aphorism: "History indeed records cases of partially educated scholars and fanatical poets, but it affords no instance of a wise man who had become an idiot."

Physiology of the Nervous System. By J. F. FULTON, M.A., D.Phil., S.B.M.D., Sterling Professor of Physiology, Yale University. Formerly Fellow of Magdalen College, Oxford. Pp. xv., 675. With 94 illustrations. London, New York, Toronto: Oxford University Press (Humphrey Milford). 1938. Price 25s. 0d.—A book on such an attractive subject as the physiology of the nervous system naturally arouses one's liveliest interest, for who would not desire to know something of the natural working of his own brain? Nor is this interest in any way lessened by noting that Professor Fulton dedicates his work, and a learned one at that, to "Students of Medicine, who must bridge the gap between the concepts of Neurophysiology and the problems of Clinical Neurology." With the imperious nature of the command no one will quarrel. The misfortune is that students of medicine never do bridge the gap, with the inevitable consequence that they mostly remain the technical masters of the signs and symptoms of a trade. Professor Fulton's work has many, very many, exceedingly good points, which it is but fair, generous, and fitting should be pointed out. Only in this way can the reader form his own judgement whether this book is for him, or only for those specialists who profess to have a knowledge, however out of date, of the physiology of the nervous system. It is refreshing to find a physiological account of the nervous system commencing with the "receptors"—that is, with the sense organs. It is more usual to find a few, but only a few, grouped together at the end of the book, under the title "Organs of Special Sense," and even these are subordinated to discussions on what appears to us to be the much less important problem of the muscle-nerve preparations of the frog. No one can ever hope even dimly to understand the functional entity of the nervous system who fails to grasp the vast significance of the stimuli to which the nervous system

reacts, the mode in which it does so, the nature of their transmission centrally, and their profound influence in making or marring what in our more grandiloquent moods we are pleased to call our minds. Hence the importance of any work which commences at the beginning, that is, with the mode of entry of stimuli into the human brain. This excellent beginning is followed by chapters on the dorsal spinal roots and the dermatones ; the motor unit ; the synapse and the elementary reflex, and central inhibition. Chapters such as these, and all are good, are again an unusually original commencement to the physiology of the nervous system. Then follow nine chapters on more ordinary lines devoted to the several anatomical parts of the central nervous system from the spinal cord upwards. The remainder of the book gives another nine chapters to the cerebral cortex, one to the basal ganglia, one to the cerebellum—a little unusually placed—and then the final one, to which we have been looking forward all the time—" The Nervous System as a Whole "—one page and a half out of the massive total of 543 ! But an explanation is given that " it has not seemed judicious to widen the scope of the book to include the vast and important literature of physiological psychology." In this chapter the author so admirably describes his own book and its purport that we cannot do better than quote it. " The physiologist tends to reduce this vast organ (the nervous system as a whole) to its ultimate anatomical units, or to such groups of units as are involved in the conventional reflex or in certain levels of functional activity." Along these lines—to our thinking a little archaic—the author gives a most admirable account of himself. Almost every chapter is introduced by a valuable historical note, and is concluded with a summary. As an instance of Fulton's general way of dealing with his problems, and one which will give readers of this review some idea of his methods, may be quoted an extract on a part of the nervous system with which most medical men have some familiarity—the motor cortex. Says Fulton: " Holmes and Page May believed that the pyramidal tract took origin solely from the Betz cells in area 4. . . . More recently it has been established that the giant pyramidal cells originating in area 2 and 5b of the parietal lobe also undergo retrograde changes after spinal lesions, and it is clear that they likewise contribute to the corticospinal system. Schroeder, Minkowski, and von Economo and Koskinas believed that they had found evidence of retrograde cell changes in the larger pyramidal cells of Layer V in area 6 following spinal lesions." Whether the idea conveyed by this

brief extract of a well-known part of the cerebral cortex—and the extract is typical of the author's method throughout—is the reader's concept of the physiology of the nervous system is for him to decide. If so, he will find Professor Fulton an admirable and learned guide to, and through, the many experimental studies made within recent years on the nervous system of man and animals. Whilst it is more open to doubt whether it bridges the "gap between neurophysiology and clinical neurology" there can be no doubt that even so learned a work fails to give any idea at all of the relationship between nerve and mind. Fulton admits this in his closing sentence when he says: "The elucidation of mental phenomena, normal and abnormal, still remains the most challenging problem of neurophysiology." The reviewer would go farther and add that physiological books of this nature will never solve the problem, unless, indeed, with the aid of the neuropathologists, whom Professor Fulton seems to ignore. Nevertheless, Professor Fulton's book is an indispensable necessity in the library of every scientific neurologist. A work so constructed demands an extensive bibliography, and the one appended is a stupendous one, including as it does 1,361 references to papers on the nervous system, with, in addition, nineteen closely-printed pages of the names of authors referred to in the text. With such an enormous mass of available information one sometimes wonders when even the physiologists are going to begin to digest it.

Whitla's Dictionary of Treatment. Eighth Edition. By R. S. ALLISON, M.D., M.R.C.P., and C. A. CALVERT, F.R.C.S.I. Pp. viii., 1,285. London: Baillière, Tindall & Cox. 1938. Price 30s.—When a book reaches an eighth edition after holding its own for forty-six years it is obvious that it has proved useful. It was a marvellous achievement of Sir William Whitla's to have planned and written a dictionary which should cover the whole general practice of medicine, surgery and midwifery in so small a volume. The marvel is that it remains so small and yet so adequate in spite of the tremendous changes and extensions of the healing art. Perhaps the truth is that there have been more changes than extensions, perhaps the old family doctor of the 1870's had to be ready to treat just as many and just the same ills, injuries and emergencies as his successors of to-day. Certainly he had to depend upon his own resources far more. Transport facilities had not brought hospitals so near to his patients, public authorities offered him no help in their treatment. As one

looks through the forty pages of closely-printed index, one does not know which causes the greater wonder—that so much information should be compressed into so few pages or that the average general practitioner should have to know so much and carries his knowledge (so wide and so exact) so lightly. The subjects dealt with are nearly all of common occurrence. This is what gives *Whitla's Dictionary of Treatment* its value and its popularity. There must be few of the conditions whose treatment is described which do not come pretty frequently under observation in any general practice. The new editors and their special contributors may be heartily congratulated on this new edition, the first which has appeared since the lamented death of Sir William Whitla in 1933. The type, paper and indexing are admirable, the subject-matter is up to date.

Symptoms and Signs in Clinical Medicine. Second Edition. By E. NOBLE CHAMBERLAIN, M.D., M.Sc., F.R.C.P. Pp. xii., 435. Illustrated. Bristol: John Wright & Sons Ltd. 1938. Price 25s.—It is less than two years since the first edition of this excellent work was reviewed in these pages. As this edition does not markedly differ from its predecessor there does not appear to be room for much further comment. A number of illustrations have been added, the laboratory and scientific sections have all been placed together in two chapters at the end of the book, extra electrocardiograms have been inserted, and other minor improvements been made. The book itself remains a most valuable introduction to medical diagnosis for all students. It is scrupulously accurate, beautifully produced, and interestingly written. Both author and publishers are to be congratulated upon a very fine piece of work.

Minor Medical Operations. K. HARRIS, M.D., F.R.C.P., and EDITH HARRIS, M.B., B.S., D.P.H. Pp. x., 198. Illustrated. London: H. K. Lewis & Co. Ltd. 1938. Price 7s. 6d.—This small handbook will fill a much-needed want for the newly qualified and the young house physician. Each operation and, what is more important, the complications and difficulties which may arise are clearly described. In a book of this size, certain omissions are bound to occur, and one feels, perhaps, that less time and space might be given to describing the contents of a linseed poultice, and more to the description of lipiodol injection of the lungs. Apart from these small defects, however, this book will be very helpful to those starting in medical practice.

Treatment in General Practice. Articles from the *British Medical Journal*. Vol. I. Second Edition. Pp. x., 259. Price 8s. 6d. Vol. II. Second Edition. Pp. xii., 436. Price 10s. 6d. London: H. K. Lewis & Co. Ltd. 1938.—The captious may say that under cover of the title they have been immersed again in the hospital schools. It is true: for general practice thrives by equipment, knowledge and resource, and turns for renewal where these can be found. The first of these volumes came under notice on its earlier issue, comprising respiratory, infective and cardio-vascular disorders. The second volume proceeds to those of the nervous, alimentary and renal systems, the anæmias, and the rheumatic and metabolic affections. Every section has the impress of its author and the interest of its details. "Head Injuries" for the man with surgical bent and accidents about him: "Diabetes" in all its aspects will find adepts in the younger rather than the older men. Diagrams interpret the skiagraphy of the intestinal tube: every doctor should understand what every patient is asking for—an X-ray. Of new drugs, sulphanilamide has come in with the current revision: amidopyrin is responsible for agranulocytosis: the new mercurials can be studied—in cardiac dropsy under "Congestive Failure": in renal under "Nephrosis." Bath, Buxton and Harrogate cannot put their salubrity into a formula, but tell of iodine and gold. Lumbar puncture may become commoner not only in spinal diagnosis, but also in relieving with venesection, accidents dealt with by Dr. Edwin Bramwell and Sir Farquhar Buzzard. Our complacency should take warning from the memoirs of a Victorian peer, abusing the Court physician: "Who could call *him* in for anything serious? He is not even an average old woman."

Medical Practice in Residential Schools. By F. G. HOBSON, D.S.O., D.M., F.R.C.P. Pp. xvi., 284. Illustrated. London: Oxford University Press (Humphrey Milford). 1938. Price 10s. 6d.—This book has been compiled by one who obviously has had much experience in work as a school doctor (although, curiously, he is only described as Physician to the Radcliffe Infirmary), and is planned as a *vade mecum* for school doctors. It contains an immense amount of information upon all subjects likely to come before those in medical charge of schools, with chapters upon organization, training, etc., as well as detailed accounts of all diseases likely to be met with. The author holds decided views, as is only right, but is fair in his presentation of his own ideas. He is not a believer in

wholesale tonsillectomy, and quotes numbers of rather unconvincing figures in support of his views. He states, for instance, that in *no circumstances* " (italics his) should tonsils be removed for nasal catarrh which can often be successfully treated by attention to the sinuses alone." There are very good chapters on streptococcal infections with excellent suggestions as to sulphanilamide treatment. Doubtless the next edition will refer to the use of the new chemotherapy in pneumococcal infections. He does not mention whole blood from adults as a protector or as a modifier in measles, and " immune globulin " receives favourable mention only in a footnote. Details of cases with dosage would be helpful, as its value appears to be rather doubtful. This book will be found most valuable as a work of reference. It is well printed, has few but excellent illustrations, copious references and annotations, and is a worthy member of a notable series of medical publications.

Cardiovascular Disease in General Practice. By T. East, D.M., F.R.C.P. Pp. x., 206. London: H. K. Lewis & Co., Ltd. 1938. Price 10s. 6d.—This book, which is written by one of the authors of *Recent Advances in Cardiology*, provides the practitioner with a sound and practical description of diseases of the heart and blood vessels. Starting with chapters on the interpretation of symptoms and the physical examination of the heart, the author proceeds to a consideration of the morbid physiology and treatment of cardiac failure. Defects in the coronary circulation are then dealt with and this is followed by a chapter on failure of the peripheral circulation, a particularly valuable contribution. After the various types of heart disease and the arrhythmias have been described, a useful chapter is devoted to diseases of the arteries and veins, and the final chapter contains a most practical section on the diagnosis of the normal heart. Throughout the book the rational management and treatment of the conditions dealt with is described in full detail. The book is excellently produced and can be thoroughly recommended to the practitioner who wishes to revise his knowledge of cardiovascular disease.

Oxygen and Carbon Dioxide Therapy. By A. CAMPBELL, M.D., D.Sc., and E. P. POULTON, D.M., F.R.C.P. Second Edition. Pp. xvi., 202. Illustrated. London: Oxford University Press (Humphrey Milford). 1938. Price 12s. 6d.—The first edition of this excellent book was reviewed in our

columns in 1935. The present edition contains two addenda, which give very clear descriptions of technical details appertaining to the administration of oxygen by catheter or by the tent method. These details of technique form a valuable addition from the clinical point of view.

Chronic Miliary Tuberculosis. By C. HOYLE, M.D., M.R.C.P. and M. VAIZEY, M.B., M.R.C.P. Pp. ix., 140. Illustrated. London: Oxford University Press (Humphrey Milford). 1937. Price 12s. 6d.—This small volume gives a lucid and most detailed account of a condition which must be described as relatively rare. The authors rather shrewdly remark that they hope to show that it is common enough to be important in the diagnosis of obscure and prolonged illnesses. If one takes an extreme case of chronic miliary tuberculosis and compares it with an extreme case of acute miliary tuberculosis the differentiation is simple and even obvious, but the dividing line is so broad and indistinct that there is a considerable number of cases which might quite fairly be classed either as rather long-drawn-out acute cases or alternatively rather rapid chronic cases. One point, however, is made quite clear, namely, that it is possible and actually not uncommon to have a case of chronic (or even acute) miliary tuberculosis of the lungs completely clearing up and a few years afterwards showing no abnormal physical signs in the chest, either by physical or X-ray examination.

The Control of Tuberculosis in England, Past and Present. By G. G. KAYNE, M.D., M.R.C.P., D.P.H. Pp. xiv., 188. London: Oxford University Press (Humphrey Milford). 1937. Price 8s. 6d.—This interesting little book could be read with profit by general practitioners and even general readers as well as by administrators and tuberculosis officers, for whom it is primarily intended. It is divided into three parts—the first two being a very lucid account of the administrative measures that have been taken in England for the control of tuberculosis, while the third part examines the problem as it exists to-day. This includes a detailed account of the average tuberculosis scheme with references to all the Ministry orders, etc., and inevitably ends with a forecast of future developments. These, Dr. Kayne is convinced, can only result in a State Medical Service. Even those who object to a State Service on principle must admit that Dr. Kayne puts his case clearly and reasonably. In fact, his attitude appears to be that, while not particularly anxious for a State Service, he can see no alternative likely to give a comparable efficiency.

Iodine Metabolism and Thyroid Function. By A. W. ELMER, M.D. Pp. xvii., 605. Illustrated. London: Oxford University Press (Humphrey Milford). 1938. Price 30s.—Although this book bears the publisher's imprint of the Oxford University Press, the sheets were printed in Poland. The paper is of the poorest quality and the setting of the type is unfamiliar, particularly the paragraph-headings, which are made striking by wide spacing of letters of the same size and from the same fount as are used in the body of the text. The author is to be congratulated on his translator, whose English is smooth and elegant, although occasionally through ignorance of current medical terms his English requires a little thought; as, for instance, "navel blood," which is a distinctly unfamiliar expression to use for blood taken from the umbilical cord at the time of parturition: "placental" would probably be better understood. "Undirectly" for "indirectly" (page 333) is perhaps only a printer's error. But on the same page we find that the presence of thyroxine could not be "stated": surely the proper translation is "proved" or "verified." On page 334 there is an odd sentence beginning: "It is not excluded that the difference in size of the cortex is due to anything more than . . . "; the true English appears to be: "It is possible that the difference in size . . . is only due to. . . ." The large section of the work devoted to the Physiology of Iodine Metabolism is fascinating reading. The conspectus of the literature is most valuable and the author's own observations are interesting and well-placed. In dealing with the Pathology of Iodine Metabolism the author contents himself with considering thyrotoxicosis, hypothyreosis and simple goitre. Here again the work done by the author himself and by others is admirably marshalled. Dr. Elmer is most critical in the acceptance of blood and urine analyses as evidence of normal or abnormal Iodine Metabolism, and on page 524 describes his own method of carrying out an "iodine tolerance test," which he claims shows a striking difference between cases with "euthyroidism" and those with thyrotoxicosis, non-toxic goitre and hypothyroidism. This is a book well worth reading; it is indispensable for a full realization of our present knowledge of thyroid function and malfunction.

The Health of the Nation and Deficiency Diseases. By J. MABERLY, M.R.C.S., L.R.C.P. Pp. xii., 118. London: Baillière, Tindall & Cox. 1938. Price 5s.—In this little book the author gives a short account of the vitamins and the deficiency diseases and a long dissertation on our present

methods of milling wheat, methods which he claims are causing disease and death among the people of the East and are slowly undermining the physique and vigour of a large section of the people of England. One chapter is devoted to describing how certain patients suffering from acute poliomyelitis recovered their health under the author's care after the administration of iodized tincture of guaiacol. He has used this drug in various bacterial infections with advantage, as it has seemed to him, to the patients. Pellagra, the anæmias, and diabetes mellitus also come under consideration. The book as a whole is of no particular interest.

Psyche and the Physiologists. By E. G. D. DRURY, M.D., B.S., D.P.H. Pp. viii., 98. London: H. K. Lewis & Co. Ltd. 1938. Price 5s.—He is a brave man who attempts to invade that no-man's land which lies between physiology and psychology. Both camps probably regard him as an alien, and his very friendliness with the opposite side enhances this suspicion. The prospective reader can be reassured in the case of this book, as the outstanding characteristics are the author's wide knowledge of both specialities, combined with marked intellectual honesty. Here is an author who has combined wide reading with general practice and has culled much wisdom from both. All theories have obviously been applied to the touch-stone of experience. Particularly interesting is the author's review of recent work on acetylcholine and its relation to clinical medicine. The book shows wide knowledge of contemporary medical literature and is written in a style that should make a wide appeal both to general practitioners and research workers. The chapter entitled "Labels and Luggage" will appeal to all interested in the medical aspects of education and the whole book is sufficiently short to form a very pleasant evening's reading.

Alcohol and Human Life. Second Edition. By C. C. WEEKS. Pp. xii., 455. Illustrated. London: H. K. Lewis & Co. Ltd. 1938. Price 6s.—This is partly a revision of *Alcohol and the Human Body* by the late Sir Victor Horsley and Dr. Mary Sturge. The second edition comes at an opportune moment in view of the temporary increase in the consumption of alcohol in this country. To all who are speaking or teaching on the subject of alcohol this book will prove a veritable store-house of facts and figures, set forth by the author in the broadest and most dispassionate manner. When it is realized that Great Britain is spending annually more than

two hundred and fifty millions on "this drug" it is obvious that all medical practitioners and students should be made fully acquainted with the scientific aspects of the alcohol question. Of especial interest at the present time is the reference to the use of cocktails, and the chapter devoted to alcohol in relation to motor driving and road traffic accidents. In the latter the technique of the quantitative tests for alcohol in the blood is described, and their value discussed. The author is opposed to the compulsory use of such a test, but is of opinion that if invoked voluntarily, it might be of great value in clearing accused persons of a charge when they know they have only consumed a trifling amount of alcohol.

Handbook of Sanitary Law. Twelfth Edition. By B. BURNETT HAM, M.D., D.P.H. Pp. xxii., 355. London: H. K. Lewis & Co. Ltd. 1938. Price 7s. 6d.—The mass of recent public health legislation has necessitated that this handbook be almost completely re-written. The book has now been brought completely up to date, and includes such recent legislation as the Factories Act, 1937, and the Food and Drugs Act of 1938. In fact, the law relating to public health administration has been clearly and concisely stated without the burden of intricate legal phraseology, which is always cumbersome to the student. The handbook will be an invaluable aid to the student studying from the larger text-books on the subject, which are frequently not quite up to date on the question of legal obligations and requirements. It will have particular appeal to students studying for the Diploma of Public Health, but it is rather advanced for the undergraduate.

Modern Anæsthetic Practice. Edited by Sir HUMPHRY ROLLESTON, Bart., G.C.V.O., K.C.B., M.D., F.R.C.P., and A. A. MONCRIEFF, M.D., F.R.C.P. Pp. 231. London: Eyre & Spottiswoode Ltd. 1938. Price 10s. 6d.—In this book the subject is divided into twelve sections, each of which is dealt with by an author who has special knowledge of that particular branch of anæsthesia, the result being that the matter contained is practical and up to date. In the introduction the reader is warned that the complicated nature of modern methods and apparatus may be a source of danger unless handled with the necessary care and attention to detail. The chapter on nitrous oxide includes a very useful account of the significance of cyanosis with this reagent, pointing out

that in exsanguinated subjects death may easily occur without any premonitory blueness ; and offering very clear guidance as to which type of patient may be expected to be suitable for nitrous oxide anæsthesia and which not. In the section on spinal anæsthesia a special point is made of the risk that this procedure may mean for patients who have suffered from severe hæmorrhage or for those who from any cause are *in extremis*. The author draws attention to the fact that certain of the complications sometimes occurring with this form of anæsthesia have yielded to modern methods of treatment, as, for instance, retention of urine, which generally can be overcome quickly by administering a drug of the acetyl-choline group such as doryl. Every section has been dealt with in the same clear style, and the authors are to be congratulated on having presented the profession with a book which is full of useful information, and which cannot fail to be appreciated. The two chapters which will probably prove of especial value to the general practitioner are those which deal respectively with post-operative care and with anæsthesia in children. The book is nicely produced, and has been furnished with a good index.

Imperial and Metric Conversion Scales. By J. W. THORNTON, M.A., B.M., M.R.C.P. Bristol : John Wright & Sons, Ltd. 1938. Price 6s.—For those to whom the manipulation of figures is a painful process, to be avoided whenever possible, but who, nevertheless, must use both the Metric and the Imperial systems of Weights and Measures, some means of comparing the two systems becomes a necessity. The Conversion Scales worked out by Dr. Thornton meet this need with the maximum convenience and scope. They cover the range between 100 kilograms and 1 milligram, and between 100 mils and 1 mil. This means between 220 lbs. (15 stone 10 lbs.) and 1/64th of a grain. The range can be extended on either side indefinitely by the use of multiples of 10. The scales can be used, easily and accurately, without the user being aware of the fact that they are logarithmic scales, or knowing what is, exactly, a logarithmic scale. What becomes evident is the great convenience of this method of comparing quantities. The Metric measurements take their calculable positions on the left of a line, and the erratic Imperial measurements on the right. The quantities are brought into close comparison in this way, and can be read off immediately.

Fifty Years of Bayer Remedies, 1888-1938. Bayer Products Ltd.—This very attractive brochure issued by the house of Bayer must be of considerable interest to the profession of medicine in that it is in itself a history of synthetic chemicals for the period. Its illustrations indicate, too, the predominance of pre-war Germany in this field. Phenacetin, antipyrin and aspirin are perhaps outstanding examples of Bayer's earlier products; while Ehrlich's years of painstaking experiments culminated in salvarsan and neo-salvarsan, the essentials of the V.D. clinics. In Bayer's aspirin, sold originally in 1 oz. bottles at 1s. per oz., we hardly foresaw the sale of one million tablets per year in Bristol alone. Novocaine was, perhaps, their leading contribution to infiltration anæsthesia, prominal and evipan their most important additions to the barbiturates; plasmoquine their main contribution to the treatment of malaria. Pioneers in the field of sulphonamides, prontosil has been possibly their greatest modern contribution to chemo-therapy. The book well represents fifty years of unceasing research, and its arrangement in sections facilitates reading.

Editorial Notes

The Standard of Living in Bristol.

THE Report of the Colston Research Society for 1935–36 announced that a Fund had been established for making a Social Survey of Bristol, and that Mr. Herbert Tout, M.A., had been appointed to a Colston Research Fellowship for the purpose of directing the Survey. A preliminary report has just been published under the title *The Standard of Living in Bristol*, which gives a brief outline of what the full report, now nearing completion, will describe in much greater detail. This pamphlet confines itself to findings on the standard of living, the aspect of the Survey which is probably of most general interest. The Survey is concerned only with that section of the people with incomes below £250 a year, which is estimated to comprise nine-tenths of the population. The method is to adopt a minimum standard of needs for the unit of the family, and by comparing income to this standard to express in terms of percentage the standard of living of the population.

To quote figures from the pamphlet in any abridged form is misleading. It is sufficient here to say that on the nutrition side the standard of needs assumes the minimum dietary recommended by the British Medical Association report of 1933, and that no one is likely to dispute the conclusion that the standard adopted is a very reasonable interpretation of the poverty line. The medical profession are probably more aware of the extent of poverty than most classes of the community,

but it must surely come as a shock to the citizens of Bristol to learn that in the Survey area about 11,000 families are living below this poverty line; that this number includes one in five of all children under 14; and that of those above the line some 21,000 families are separated from it by so small a margin that expenditure on recreation, tobacco or drink is liable to bring them below.

It is interesting to note how small was the opposition to what must have been a somewhat delicate investigation. About 93 per cent. of the families approached gave the desired information, a tribute to the tact with which the inquiry was conducted.

Mr. Tout has been notably successful in his task of compressing the data into sixty-four pages, and at the same time making such a clear and intelligible summary of the findings. The scientific approach to social problems is still in its infancy. This cold and dispassionate presentation of scientifically established facts is more painfully convincing than any appeal of charity, and should do far more to bring home to public attention the urgency and the immensity of the problem.

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Benger's Food, New Factory.

IN the heart of Cheshire, amid picturesque country surroundings, stands the new home of Benger's Food Ltd. It is at Holmes Chapel—some twenty-five miles south of Manchester. This new factory has been built to provide accommodation for the manufacture of new pharmaceutical and medical products. It stands in what will shortly be spacious gardens at the front and at one side, and sports ground on the other side, and has been built as a square

bounding a quadrangle which will be made into a lawn and rose garden. The main frontal portion of the building contains on the ground floor: stock room, despatch and printing departments, and on the upper floor: executive and general offices, laboratory and boardroom. The manufacturing processes and packing of Benger's Food and other specialities are carried out in the rear portion of the factory. Striking features of the manufacturing section are the glazed white tiles, which surface the walls from ground to ceiling—an introduction which makes for brightness and cleanliness in any building—the loftiness and spaciousness of all departments, the modern decorations and lighting, and the red tiled floor which is laid throughout.

Messrs. Benger's Food Ltd. will welcome the visit of members of the medical profession who may be passing, at any time between the hours of ten and twelve, and two and four o'clock. Holmes Chapel is on the main road from the Potteries to Manchester.

Obituary

PATRICK WATSON-WILLIAMS.

DR. PATRICK WATSON-WILLIAMS died at his home in Rodney Place, Clifton, on 14th November, at the age of 77. *The Lancet* in a memoir of him said: "By his death we have lost a most valuable and enterprising member of that small band of pioneers who in this country changed oto-rhino-laryngology from a casual occupation to a highly developed speciality." Patrick Watson-Williams was born in Clifton, where his father, Dr. Eubulus Williams had practised for many years. He was educated at Clifton College and University College, Bristol, qualifying as M.R.C.S. in 1884, and taking the M.B. (London) with honours in 1885. He worked as a student at the Bristol

Elliott & Fry Ltd., London.

P. WATSON-WILLIAMS, M.D. Lond.

UNIV. OF MICH.

Royal Infirmary and remained on the staff there during the remainder of his life. He held the offices of house physician in 1887, assistant physician in 1888, and physician in 1905. During his long term as assistant physician he turned his attention to rhino-laryngology and acted as clinical assistant at the London Throat and Ear Hospital and the Central London Hospital.

He wrote (with Sir Felix Semon) the chapters on diseases of the throat in Allbutt's *System of Medicine* and was responsible for the sections in the *Medical Annual* on these diseases from 1890 onwards. In 1892 he published his *Diseases of the Upper Respiratory Tract*, which met with immediate success and carried his reputation far beyond the limits of his own country.

From 1897 to 1905 he was physician to Clifton College. In 1906 a new department for diseases of the throat and nose was established at the Bristol Royal Infirmary, of which he was placed in charge. He worked as head of this department until 1921, when he retired from the active staff and was elected consulting surgeon to the department, which after 1910 had been enlarged to include diseases of the ear. He had helped his friend and colleague, Sir Felix Semon, to found the Laryngological Society of London, which later became the Laryngological Section of the Royal Society of Medicine, and of this section he was president in 1910. In 1911 he represented the Society at the Berlin International Laryngological Congress. He was also president of the Laryngological Section of the British Medical Association in 1906. In 1925 he delivered the Semon lecture at London University on "The Relation of Chronic Nasal Sinus Infection to Septic Psychoses." In 1927 he was *Président d'Honneur* of the *Societé française d'Otologie et Laryngologie* in Paris. In 1934 the University of Bristol (whose degree of M.D. he had taken *ad eundem gradum* in 1912) recognized his distinguished services to his university and medicine in general by bestowing on him the M.D. degree *honoris causa*.

During the Great War Watson-Williams was consultant for diseases of the ear, nose and throat to the military hospitals in the Southern Command, with the rank of major.

The Bristol Medico-Chirurgical Society was deeply indebted to him. Not only was he in constant attendance at their meetings and a frequent contributor to discussions, but from 1900 to 1912 he was assistant editor and from 1912 to 1926 he was editor of this *Journal*. During the difficult days of the war and the period immediately following, his indomitable energy kept the *Journal* alive. Just before his retirement

from the editorial chair in 1926 he succeeded in changing the *format* of the *Journal*, announcing the change in a characteristic editorial note : " With this issue (Spring, 1926) the Society's *Journal* appears in larger pages and type, which it is believed will enhance its value to our readers, in that the matter is presented in a better form, perhaps more worthy of the intimate association of the Medico-Chirurgical Society with the University of Bristol . . . With the completion of this issue the Editor resigns his charge with gratitude to the Committee for appointing him to this office for so many years past." The improvements which he then introduced were largely due to his knowledge of the technical aspects of printing and illustration. On 13th October, 1926, he was elected an Honorary Member of the Society.

" A. J. W.," writing of him in the *British Medical Journal*, summed up Dr. Watson-Williams's life into three periods :—

The initial phase was that of the physician taking an interest in laryngology, and particularly in helping it to evolve into a recognized specialized branch of surgery. In the second phase, having appreciated the wide possibilities open to the laryngologist by the evolution of modern surgery, he threw himself with extraordinary perseverance, ingenuity, and intelligence into the elaboration of the technique of operations, particularly those designed for the treatment of infections of the nasal accessory sinuses. As a result of this phase of his work instruments and methods devised by him are in use in all parts of the world. The third phase is represented by a combination of the outlook of the general physician and the operating surgeon. Here he set himself to emphasize the neglected close association between infection, particularly in the region of the nose and throat, and general constitutional disease, his opinions on this subject being well in advance of his time. He has left behind him many contributions to medical literature, and, apart from articles in the various journals, he wrote a textbook, *Diseases of the Upper Respiratory Tract*, and articles on diseases of the nose, throat, and trachea in Clifford Allbutt's *System of Medicine*. More recently, as evidence of the third phase, he wrote a book, *Chronic Nasal Sinusitis and its Relation to General Medicine*. As an artist he was highly accomplished, evidence of this gift being furnished by the many illustrations in his work which emanated from his own pencil. It was a real pleasure to watch him rapidly sketch pathological conditions which he might be demonstrating.

His old friend and colleague, Dr. James Swain, writes :—

Watson-Williams' career seems to be an illustration of the ancient proverb that "Chance contrives better than we ourselves," for when he was a resident officer at the Bristol Royal Infirmary he was an eligible candidate for the newly-formed post of Honorary Obstetric Physician.

In those days appointments to the medical staff were obtained by the votes of the Trustees, and there is little doubt that Watson-Williams would have been chosen had it not been for the questionable methods adopted by some of those who were unfavourable to his candidature, in consequence of which he withdrew his application.

This was a severe blow at the beginning of his professional work, but it proved to be a blessing in disguise, for, with characteristic pluck and determination, he decided to devote his energies to another branch of medicine, and the foundation of his life's work was inaugurated when he was appointed Assistant Physician to the Bristol Royal Infirmary and in charge of the Throat Department.

He was, however, a man of long views and saw the desirability of establishing a special department for Diseases of the Ear, Nose and Throat. His advocacy was ultimately rewarded by the formation of this department, of which he was elected to take charge, and in this position he worked with untiring devotion to his speciality and gained an international reputation.

Many of us have to be content with the pursuit of our ideals without attaining them, but Watson-Williams achieved his object and deserved to do so.

> "'Tis not in mortals to command success,
> But we'll do more, Sempronius, we'll deserve it."

He sought relaxation in the casting of a fly or in the handling of a billiard cue and was a good exponent of both. He also had a natural ability for drawing and could etch his own Christmas cards and trace the predominant expression in a portrait with a few strokes of his pencil. He had a generous disposition, was "given to hospitality," and fully enjoyed his position as host at the scrumptious banquets which he gave on various public occasions. In private life, those of us who were privileged to sit at his table know with what courtesy he presided and how solicitous he was that his guests should receive freely of all that he could provide. This is not the place to refer to his copious contributions to medical literature,

but the writer is glad to remember that he had the pleasure of revising the proof sheets of the first edition of Watson-Williams' book on *Diseases of the Upper Respiratory Tract*, published in in 1894. His many friends will miss his kindly welcome and genial smile: he leaves behind an honoured name in the annals of Bristol and its medical school.

In 1889 Dr. Watson Williams married Margaret, a daughter of the late Dr. Edward Long Fox, of Clifton. He leaves a widow, three daughters and two sons, one of whom is in charge of the department at the Royal Infirmary which his father established.

HARRY FRANCOIS DEVIS, M.R.C.S., L.R.C.P.

THE death of Dr. H. F. Devis, at the age of 76, removes one of the older students of the Bristol Medical School. A man who in his day played a prominent part in medical as well as municipal politics. He qualified in 1888 after winning at the Bristol General Hospital the Martin Memorial, Clarke and Sanders Scholarships. He was an all-round athlete, being a notable Rugby player and a keen cricketer. He practised for many years in Knowle, and was President of the Knowle Cricket Club. From 1906 to 1913 Dr. Devis represented the Somerset Ward in the Bristol City Council. When Mr. Lloyd George introduced his National Health Insurance Bill in 1911, Dr. Devis was an active participant in the prolonged discussions to which it gave rise between the medical profession and the politicians. Such, however, was his personal charm and forbearing manner that Dr. Devis could always engage in controversy without producing disharmony.

When the National Health Insurance Act became law Dr. Devis retired from practice and became Secretary to the Local Panel Committee and represented this Committee on the Medical Service Committee. In 1926 he retired from Bristol to reside in Marazion, where he died on 8th November last. Dr. Devis leaves a widow and a large family, none of whom, however, chose their father's profession.

NEIL PATRICK ESKELL, M.A.CANTAB, M.R.C.S., L.R.C.P.

ON 9th November, 1938, the death occurred of Dr. N. P. Eskell, of 167 Wells Road, Bristol. Dr. Eskell was the son of Dr. Patrick Eskell, of Bath. He was educated at Clifton College and Pembroke College, Cambridge. After leaving

Cambridge he completed the clinical part of his medical curriculum in Bristol, and obtained the qualification M.R.C.S., L.R.C.P. in 1935. He had held the posts of House Physician and Deputy Resident Surgical Officer at the Bristol General Hospital. He then settled in practice at Knowle, where he had become a general favourite. He held at the time of his death the appointments of Honorary Anæsthetist to the Bristol General Hospital and Cossham Memorial Hospital and Medical Officer to the Bristol Speedway. His favourite sport was swimming, at which he had represented in turn the Universities of Cambridge and Bristol.

His early death is deeply deplored by all who knew him.

In 1937 he married Phyllis, daughter of Mr. Herbert Rogers, of Edgbaston.

Meetings of Societies

Bristol Medico-Chirurgical Society

SIXTY-SIXTH SESSION, 1938–1939.

THE Annual Meeting of the Society was held in the Physiological Lecture Theatre, Bristol University, on Wednesday, 12th October, 1938, at 8.30 p.m. Eighty-nine members were present.

Mr. Clifford Moore resigned the Chair to the new President, Dr. Leonard A. Moore. A vote of thanks to the retiring President was proposed by Mr. Wright, seconded by Dr. Milling, and carried with acclamation.

Dr. Leonard A. Moore then gave his inaugural address, entitled "**Medicine and the Drama.**" Professor Rendle Short proposed and Mr. Stock seconded a vote of thanks to the President for his address.

The annual reports of the Honorary Secretary, the Honorary Treasurer and the Honorary Editor of the Society's *Journal* were read and adopted.

The Society then elected the officers for the ensuing year, Dr. Charles Corfield being adopted as President-Elect. The

BRISTOL MEDICO-CHIRURGICAL SOCIETY.

INCOME AND EXPENDITURE ACCOUNT for the year ended 30th September, 1938.

INCOME.

	£ s. d.	£ s. d.
Members' Subscriptions ..	282 19 6	
Do., outstanding for 1937–1938	44 2 0	
		327 1 6
Interest on Bank Deposits		2 11 2
Interest on £500 4 per cent. Consolidated Stock, less tax		14 15 0
		£344 7 8

EXPENDITURE.

	£ s. d.	£ s. d.
Grant to *The Bristol Medico-Chirurgical Journal*		205 0 0
Librarian—Honorarium		15 0 0
Miscellaneous Expenses—		
Goodway–Refreshments	17 0 0	
Postages and Sundries	11 0 0	
Printing and Stationery	10 14 6	
Audit Fee	2 2 0	
Lantern and Cinematograph at Meetings ..	4 4 0	
University Marshal ..	1 0 0	
Lewis's Medical and Scientific Library—		
Subscription	5 10 0	
Postages ..	0 17 9	
	6 7 9	
Share of Expenses Cathedral Service ..	2 14 0	
Cleaning and Reframing Pictures	2 12 6	
		57 14 9
		277 14 9
Surplus for the year		66 12 11
		£344 7 8

BALANCE SHEET as at 30th September, 1938.

LIABILITIES AND CAPITAL.

	£ s. d.	£ s. d.
Sundry Creditors		68 18 6
Capital as at 30th Sept., 1937	1,067 13 10	
Add Surplus for the year	66 12 11	
		1,134 6 9
		£1,203 5 3

ASSETS.

	£ s. d.	£ s. d.
Cash at Bank—		
Current Account	545 9 9	
Deposit Account	176 4 6	
		721 14 3
£500 4 per cent. Consolidated Stock at cost		437 9 0
Sundry Debtors—		
Members' Subscriptions for 1937–1938 outstanding ..		44 2 0
		£1,203 5 3

Audited and found correct,
H. E. KEELER,
Chartered Accountant,
Auditor.

16–18 CLARE STREET, BRISTOL 1.
10*th October*, 1938.

Honorary Treasurer, Mr. A. E. Iles, and the Honorary Secretary, Mr. R. V. Cooke, were re-elected.

Professor Nixon proposed and Mr. Scarff seconded the names of the following members to serve on the Medical Library Committee: Professor Perry, Professor Drew Smythe and Professor Rendle Short.

The second meeting of the session was held in the Physiological Lecture Theatre, Bristol University, on Wednesday, 9th November, at 8.30 p.m.

Dr. Leonard Moore was in the Chair, and sixty-five members were present.

Mr. F. W. Willway shewed a blind patient with his Alsatian guide-dog. Dr. Bush shewed skiagrams and Dr. Fraser pathological specimens.

After discussion it was decided to hold future meetings in the Physics Lecture Theatre, Royal Fort. Professor Tyndall had kindly offered the use of his department and the service there.

Professor Hewer gave a lecture, illustrated by lantern slides, "**Syphilis in the Tropics,**" and replied to questions raised by Professor Nixon.

The third meeting of the session was held in the Physics Lecture Theatre, Royal Fort, on Wednesday, 14th December, at 8.30 p.m.

Dr. Leonard Moore was in the Chair, and 127 members were present.

Dr. Burgin showed skiagrams and Dr. A. L. Taylor pathological specimens.

Professor G. Hadfield gave an address on "**The Anæmias: a survey of our present knowledge,**" replying to the various questions asked by Mr. Adams, Mr. Pridie, Dr. Paul Bodman and Dr. Milling.

The Medical Library of the University of Bristol

WITH WHICH IS INCORPORATED

The Library of the Bristol Medico-Chirurgical Society.

The following donations have been received since the publication of the list in October, 1938.

December, 1938.

Dr. E. G. C. F. Atchley (1)	3 volumes.
C. T. Campion Bequest (2)	1 volume.
Carnegie Institution (3)	2 volumes.
Professor E. W. Hey Groves (4)	8 volumes.
Sir W. Arbuthnot Lane (5)	1 volume.
W. R. Lefanu (6)	1 volume.
National Association for the Prevention of Tuberculosis (7)	1 volume.
Professor C. Bruce Perry (8)	1 volume.
Royal College of Surgeons (9)	1 volume.

Unbound periodicals have also been received from Dr. R. F. Barbour, Professor E. W. Hey Groves, Professor C. Bruce Perry, Dr. G. R. A. de M. Rudolf and Dr. J. Odery Symes.

THE ONE HUNDRED AND SIXTY-FIFTH LIST OF BOOKS

The figures in round brackets refer to the figures after the names of the donors. The books to which no such figures have been attached have either been bought from the Library Fund or received through the *Journal*.

Bardswell, N. D. .. *Tuberculosis in Cyprus* .. .. (7) 1937

Benedict, F. G., and Lee, R. C. *Hibernation and Marmot Physiology* .. .. (3) 1938

Bircher, E... .. .. *Das Kropfproblem* .. .. (4) 1937

Bramwell, C., and Longson, E. A. *Heart Disease and Pregnancy* .. 1938

Buckley, C. W... .. *Arthritis, Fibrositis and Gout* 1938

Catalogue of Lewis's Medical and Scientific Lending Library. Part I. Authors and Titles 1938

Chamberlain, E. Noble. *Symptoms and Signs in Clinical Medicine* 2nd Ed. 1938

Darling, H. C. R. .. *Surgical Nursing and After-Treatment* 6th Ed. (4) 1938

Drury, E. G. Dru .. *Psyche and the Physiologists* 1938

Elliott, John .. .. *The Medical Pocket-book* .. .. 3rd Ed. (1) 1791

Ewart, E. D. .. .. *A Guide to Anatomy* .. .. .. 4th Ed. 1938

Fox, R. Fortescue .. *Evolution of Chronic Rheumatism* 1938

Freind, John .. .. *Chymical Lectures* 1712

Friedländer, E. .. .. *Die Therapie der Thrombose* .. .. .. (4) 1938

Harris, K., and Harris, E. *Minor Medical Operations* 1938

Henry, Sir E. R., Bart. *Classification and Uses of Finger Prints* .. 1937

Hirschfeld and Leveillé *Neurologie ou Description et Iconographie du Système Nerveux* .. .. (1) 1853

Hobson, F. G. .. .. *Medical Practice in Residential Schools* .. 1938

Hodges, N. .. .. *Loimologia ; or an Historical Account of the Plague in London in* 1665 .. 3rd Ed. (1) 1721

Jamieson, E. B. .. *Illustrations of Anatomy for Nurses* .. (4) 1938

Janssen, P. .. .. *Chirurgische Erkrankungen der Harnorgane* (4) 1938

Joules, H. .. .. .. *The Doctor's View of War* 1938

Kress, H. F., and Kittler, W. *Innere Medizin in der Chirurgie* (4) 1938

Laignel-Lavastine, M., and Koressios, N. T. *Recherches sur la Sclérose en Plaques* .. .. (8) 1938

Lane, Sir W. Arbuthnot *Bibliography of Published Writings* .. (5) 1938

Le Fanu, W. R. .. *British Periodicals of Medicine* .. .. (6) 1938

Micks, R. H. .. .. *Essentials of Materia Medica, Pharmacology and Therapeutics* .. .. .. 2nd Ed. 1938

Møller-Christensen, V. *The History of the Forceps* 1938

Nixon, J. A., and Nixon, D. G. C. *Text-book of Nutrition* 1938

Shattuck, G. C. .. *A Medical Survey of the Province of Guatemala* (3) 1938

Still, G. F. .. .. *Common Happenings in Childhood* 1938

Treatment in General Practice. Articles reprinted from *The British Medical Journal.* Vols. I–II .. 2nd Ed. 1938

Vaubel, E. .. .. *Die Arthroskopie* .. .. (4) 1938

Watson, J. K. .. .. *Anaesthesia and Analgesia for Nurses and Midwives* 1938

Weeks, C. C. .. .. *Alcohol and Human Life* .. .. 2nd Ed. 1938

Wells, C. .. .. .. *A Manual of Surgery for Nurses* .. (4) 1938

TRANSACTIONS, REPORTS, JOURNALS, ETC.

Calendar of the Royal College of Surgeons, 1938 .. .. .. (9) 1938

Historisch-literarisches Jahrbuch für die deutsche Medicin. Vols. I–III 1838–40

Medical Directory, 1939 1938

Natural Food. Vols. I–III .. .. (2) 1891–93

Quarterly Cumulative Index Medicus. Vol. 23 1938

Reports on Chronic Rheumatic Diseases. No. 4 1938

St. Bartholomew's Hospital Reports. Vol. LXXI 1938

Publications Received

From Messrs. Baillière, Tindall & Cox:

The Health of the Nation and Deficiency Diseases. By John Maberly, M.R.C.S.(Eng)., L.R.C.P.(Lond.). Price 5s.

Whitla's Dictionary of Treatment. 8th Edition. By R. S. Allison, M.D., M.R.C.P.(Lond.), and C. A. Calvert, M.B., B.Ch., F.R.C.S.I. Price 30s.

From Messrs. Bayer Products Ltd.:

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From Messrs. H. K. Lewis & Co. Ltd.:

Catalogue of Lewis's Medical and Scientific Lending Library. Part I. Authors and Titles. New edition, revised to the end of 1937. Price 16s. (to subscribers 8s.).

Cardiovascular Disease in General Practice, By Terence East, M.A., D.M., F.R.C.P. Price 10s. 6d.

Handbook of Sanitary Law for the use of Candidates for Public Health Qualifications. By B. Burnett Ham, M.D., D.P.H. 12th Edition. Price 7s. 6d.

Minor Medical Operations. By Kenneth Harris, M.A., M.D., F.R.C.P., and Edith Harris, M.B., B.S., D.P.H. Price 7s. 6d.

More Thoughts of a Doctor. By F. Parkes Weber, M.A., M.D., F.R.C.P., F.S.A. Price 1s. 6d.

Alcohol and Human Life. By Courtenay C. Weeks, M.R.C.S., L.R.C.P. Price 6s.

From Oxford University Press (Humphrey Milford):

A Cerebral Atlas. By Richard J. A. Berry, M.D., F.R.S.E., F.R.C.S.E. Price £5 5s.

Iodine Metabolism and Thyroid Function. By A. W. Elmer, M.D. Price 30s.

Oxygen and Carbon-dioxide Therapy. By Argyll Campbell, M.D., D.Sc.(Edin.), and E. P. Poulton, M.A., D.M.(Oxon.), F.R.C.P.(Lond.). 2nd Edition. Price 12s. 6d.

Physiology of the Nervous System. By J. F. Fulton, M.A., D.Phil., S.B., M.D. Price 25s.

Medical Practice in Residential Schools. By F. G. Hobson, D.S.O., D.M., F.R.C.P. Price 10s. 6d.

From MESSRS. JOHN MURRAY:

St. Bartholomew's Hospital Reports. LXXI. Price 15s.

From MESSRS. JOHN WRIGHT & SONS LTD:

British Journal of Surgery. Vol. XXVI. No. 102. Price 12s. 6d.

Symptoms and Signs in Clinical Medicine. By E. NOBLE CHAMBERLAIN, M.D., M.Sc., F.R.C.P. 2nd Edition. Price 25s.

Imperial and Metric Conversion Scales. By J. W. THORNTON, M.A., B.M., M.R.C.P. Price 6s.

Local Medical Notes

EXAMINATION RESULTS.

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M.D. (by Thesis).—C. H. G. Price.

M.B., Ch.B.—*Second Examination. Pass:* A. J. F. Saxton, Dorothy Hughes, W. G. H. Hunt, Mary Jacob, Mary E. Loewe, Jyotikana Datta.

M.B., Ch.B. (Section I).—*Final Examination. Pass:* Ruth Appleby,† Dorothy M. Ayre, D. L. Bayley, D. C. Bodenham,† Jean A. Butt, Mary Crago, J. N. P. Davies,† Marjorie O. Dunster,† J. L. Elliott,† J. L. Emery, Sara M. Field-Richards, E. M. Grace, Betty F. Hannaford,† F. R. Hurford, Rosemary W. Knowles, N. E. Melling, C. A. St. Hill,†‡ Jeannette Shed,† Dorothy M. Shotton,† P. R. H. Slade, A. A. Stonehill, E. M. Wagstaff,† T. H. White.†

B.D.S.—*Third Examination. Pass: In Dental Mechanics and the Properties of Materials used in Dental Practice:* F. C. Baker, J. R. D. Gordon.

B.D.S.—*Final Examination. Pass:* G. R. Styles.

L.D.S.—*Second Examination. Pass: In Dental Anatomy:* B. N. Neilson. *In Anatomy and Physiology:* L. Murray, R. S. Saxton.

† With distinction in Materia Medica, Pharmacy, Pharmacology, Pharmacotherapeutics and Toxicology.

‡ With distinction in Pathology and Bacteriology.

L.D.S.—*Third Examination. Pass: In Dental Mechanics and the Properties of Materials used in Dental Practice:* J. R. Herbert, O. H. Minton, C. R. Sage, R. H. G. Sims. *In Dental Materia Medica:* J. C. Jowett, R. B. Stiles.

L.D.S.—*Final Examination. Pass:* *A. J. H. Orchard, *Peggy M. Rooke, F. W. Clift, J. W. S. Jenkins.

Conjoint Board.—L.R.C.P., M.R.C.S.—*Pass:* Margot H. Dickson (Anatomy), D. J. Jones (Anatomy and Physiology), *Margaret E. M. Slater (Medicine), R. T. Moore (Medicine), E. A. Griffiths (Pathology and Midwifery), A. L. T. Beddoe (Midwifery), E. B. Hughes (Pathology), Rotha H. Barnfield (Surgery), Joan E. Mackworth (Surgery), E. Meriel Wagstaff (Pathology).

Diploma in Child Health.—*Pass:* R. G. Wilbond.

* Qualified.

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Index

Abreu, A. L. d'.—Thoracic surgery, 43

Adams, A. W.—Lobectomy for bronchiectasis, 63

Air as a conductor of electricity.—A. M. Tyndall, 211

Appointments:—

Miss Helen Bell, Matron at Bristol Royal Infirmary, 150

Miss A. Cameron, Matron at St. Monica's Home of Rest, 150

T. F. Hewer, Professor of Pathology in the University of Bristol, 141

Association of Physicians, 141

Berry, R. J. A.—Cerebral malformations, 111

Blind, A guide dog for the.—F. W. Willway, 235

Book Reviews, 67, 132, 199, 245

Bristol, Standard of Living in, 260

Bronchiectasis, Lobectomy for.—A. W. Adams, 63

Burnham-on-Sea, Medicinal waters.—J. A. Nixon, 191

Cerebral malformations.—R. J. A. Berry, 111

Chitty, H. — Some tuberculous conditions, 161

Colston Research Society, Social Survey, 260

Daviesville.—J. A. Nixon, 191

Devis, Harry Francois.—Obituary, 266

Drinker's "Iron Lung" and other artificial respirators.—J. A. Nixon, 239

Electricity, Air as a conductor of.—A. M. Tyndall, 211

Eskell, Neil Patrick.—Obituary, 266.

Examination Results, 91, 149, 210, 273

Foss G. L.—Clinical applications of the male and female sex hormones, 23

Gee, C. A. H.—Obituary, 145

Hewer, T. F.—Syphilis in the tropics, 217

Insulin, Protamine.—J. A. Nixon, 121

Intra-cranial tumours.—F. W. Willway, 151

Library, 86, 146, 207, 270

Library Association, University and Research Section, 203

Ling, T. M.—Psychological factors in disease, 101

Lobectomy for bronchiectasis.—A. W. Adams, 63

Local Medical Notes, 91, 149, 210, 273

Long Fox Memorial Lecture.—A. M. Tyndall, 211

MacWatters, J. C.—Obituary, 83

Medical defence.—C. A. Moore, 1

Moore, C. A.—Medical defence, 1

Nixon, J. A.—Use of protamine insulin, 121

Nixon, J. A.—Medicinal waters at Burnham-on-Sea, 191

Nixon. J. A.—Drinker's "Iron Lung" and other artificial respirators, 239.

Nursing (Editorial), 80

Obituaries—

Harry Francois Devis, 266

Neil Patrick Eskell, 266

Obituaries—(*continued*)
C. A. H. Gee, 145
J. C. MacWatters, 83
Patrick Watson-Williams, 262
C. G. Russ Wood, 205
Hartland S. Wright, 82

Presidential Address.—C. A. Moore, 1

Protamine insulin, Use of.—J. A. Nixon, 121

Psychological factors in disease.—T. M. Ling, 101

Publications received, 90, 148, 209, 272

Reviews of Books, 67, 132, 199, 245

Royal Fort, History of, 142

Societies :—
Bristol Medico-Chirurgical, 85, 146, 267

Sex hormones, Clinical application of the male and female.—G. L. Foss, 23

Sinclair, H. M.—Vitamin B complex, 173

Syphilis in the tropics.—T. F. Hewer, 217

Thoracic surgery.—A. L. d'Abreu, 43
Development of (Editorial), 78

Tuberculous conditions, Some.—H. Chitty, 161

Tumours, Intra-cranial.—F. W. Willway, 151

Tyndall, A. M.—Air as a conductor of electricity (Long Fox Memorial Lecture), 211

The Standard of Living in Bristol (Editorial), 260

Vitamin B complex.—H. M. Sinclair, 173

Watson-Williams, P.—Obituary, 262

Willway, F. W.—A guide dog for the blind, 235
Intra-cranial tumours, 151

Wood, C. G. Russ.—Obituary, 205

Wright, H. S.—Obituary, 82

173
217

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CONTENTS.

	Page
The Twenty-seventh Long Fox Memorial Lecture: Air as a Conductor of Electricity. By Professor A. M. TYNDALL, D.Sc., F.R.S.	211
Syphilis in the Tropics. By T. F. HEWER, M.D., M.R.C.P.	217
A Guide Dog for the Blind. By F. WILFRED WILLWAY, F.R.C.S.	235
Drinker's "Iron Lung" and other Artificial Respirators. By J. A. NIXON, C.M.G., M.D., F.R.C.P.	239
Reviews of Books	245
Editorial Notes	260
Obituaries: PATRICK WATSON-WILLIAMS, M.D.	262
HARRY FRANCOIS DEVIS, M.R.C.S., L.R.C.P.	266
NEIL PATRICK ESKELL, M.A. Cantab, M.R.C.S., L.R.C.P.	266
Meetings of Societies	267
The Medical Library of the University of Bristol	270
Publications Received	272
Local Medical Notes	273

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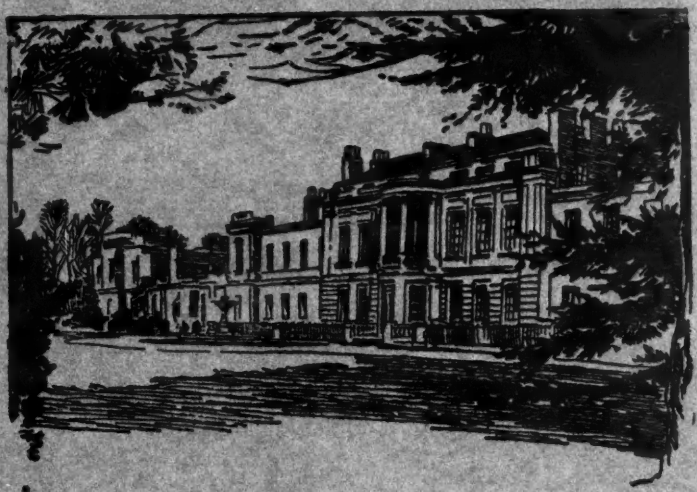

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